

SERVICE

MANUAL

DVC-T6300N

For version 2



Component descriptions

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1. Precautions

1-1 Safety Precautions

1) Before returning an instrument to the customer, always make a safety check of the entire instrument, including, but not limited to, the following items:

(1) Be sure that no built-in protective devices are defective or have been defeated during servicing.

(1) Protective shields are provided to protect both the technician and the customer. Correctly replace all missing protective shields, including any remove for servicing convenience.

(2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, nonmetallic control knobs, insulating fish papers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning.

(2) Be sure that there are no cabinet openings through which adults or children might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, excessively wide cabinet ventilation slots, and an improperly fitted and/or incorrectly secured cabinet back cover.

(3) Leakage Current Hot Check-With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use a isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards institute (ANSI) C101.1 Leakage

Current for Appliances and Underwriters Laboratories (UL) 1270 (40.7). With the instrument's AC switch first in the ON position

and then in the OFF position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle brackets, metal cabinets, screwheads, metallic overlays, control shafts, etc.), especially and exposed metal parts that offer an electrical return path to the chassis.

Any current measured must not exceed 0.5mA.

Reverse the instrument power cord plug in the outlet and repeat the test. See Fig. 1-1.

Any measurements not within the limits specified herein indicate a potential shock

hazard that must be eliminated before returning the instrument to the customer.

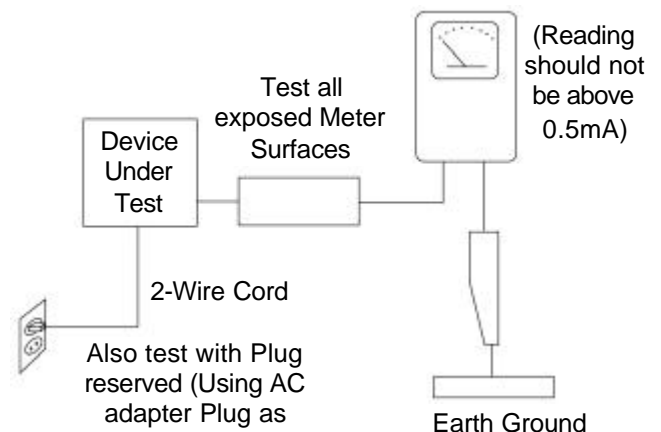


Fig. 1-1 AC Leakage Test

(4) Insulation Resistance Test Cold Check-(1) Unplug the power supply cord and connect a jumper wire between the two prongs of the plug. (2) Turn on the power switch of the instrument. (3) Measure the resistance with an ohmmeter between the jumpered AC plug and all exposed metallic cabinet parts on the instrument, such as screwheads, antenna, control shafts, handle brackets, etc. When an exposed metallic part has a return path to the chassis, the reading should be between 1 and 5.2 megohm. When there is no return path to the chassis, the reading must be infinite. If the reading is not

Servicing Precautions

- (5) within the limits specified, there is the possibility of a shock hazard, and the instrument must be re-pared and rechecked before it is returned to the customer. See Fig. 1-2.

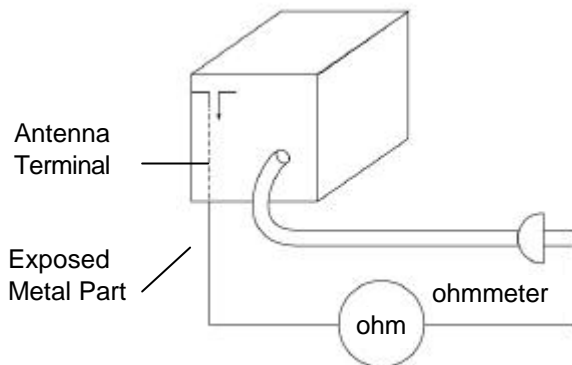




Fig. 1-2 Insulation Resistance Test

- 2) Read and comply with all caution and safety related notes non or inside the cabinet, or on the chassis.
- 3) Design Alteration Warning-Do not alter of add to the mechanical or electrical design of this instrument. Design alterations and additions, including but not limited to, circuit modifications and the addition of items such as auxiliary audio output connections, might alter the safety characteristics of this instrument and create a hazard to the user. Any design alterations or additions will make you, the service, responsible for personal injury or property damage resulting there from.
- 4) Observe original lead dress. Take extra care to assure correct lead dress in the following areas: (1) near sharp edges, (2) near thermally hot parts (be sure that leads and components do not touch thermally hot parts), (3) the AC supply, (4) high voltage, and (5) antenna wiring. Always inspect in all areas for pinched, out-of-place, or frayed wiring, Do not change spacing between a component and the printed-circuit board. Check the AC power cord for damage.
- 5) Components, parts, and/or wiring that appear to have overheated or that are otherwise damaged should be replaced with components, parts and/or wiring that meet original specifications. Additionally determine the cause of overheating and/or damage and, if necessary, take corrective action to remove and potential safety hazard.
- 6) Product Safety Notice-Some electrical and mechanical parts have special safety-related characteristics which are often not evident from eviusual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by shading, an () or a () on schematics and parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might created shock, fire and/or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

1-2 Servicing Precautions

CAUTION : Before servicing Instruments covered by this service manual and its supplements, read and follow the Safety Precautions section of this manual.

Note : If unforeseen circumstance create conflict between the following servicing precautions and any of the safety precautions, always follow the safety precautions. Remember: Safety First.

1-2-1 General Servicing Precautions

- (1) a. Always unplug the instrument's AC power cord from the AC power source before (1) removing or reinstalling any component, circuit board, module or any other instrument assembly, (2) disconnecting any instrument electrical plug or other electrical connection, (3) connecting a test substitute in parallel with an electrolytic capacitor in the instrument.
- b. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.
- c. Do not apply AC power to this instrument and /or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
- d. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

Note : Refer to the Safety Precautions section ground lead last.

- (2) The service precautions are indicated or printed on the cabinet, chassis or components. When servicing, follow the printed or indicated service precautions and service materials.

- (3) The components used in the unit have a specified flame resistance and dielectric strength.

When replacing components, use components which have the same ratings. Components identified by shading, by (A) or by (B) in the circuit diagram are important for safety or for the characteristics of the unit. Always replace them with the exact replacement components.

- (4) An insulation tube or tape is sometimes used and some components are raised above the printed wiring board for safety. The internal wiring is sometimes clamped to prevent contact with heating components. Install such elements as they were.
- (5) After servicing, always check that the removed screws, components, and wiring have been installed correctly and that the portion around the serviced part has not been damaged and so on. Further, check the insulation between the blades of the attachment plug and accessible conductive parts.

1-2-2 Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power ON. Connect the insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts(see note) should be more than 1 Megohm.

Note : Accessible conductive parts include metal panels, input terminals, earphone jacks, etc.

1-3 ESD Precautions

Electrostatically Sensitive Devices (ESD)

Some semiconductor (solid state) devices can be damaged easily by static electricity.

Such components commonly are called Electrostatically Sensitive Devices(ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

- (1) Immediately before handling any semiconductor components or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
- (2) After removing an electrical assembly equipped with ESD devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
- (3) Use only a grounded-tip soldering iron to solder or unsolder ESD device.
- (4) Use only an anti-static solder removal devices. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESD devices.
- (5) Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.
- (6) Do not remove a replacement ESD device from

its protective package until immediately before you are ready to install it. (Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive materials).

- (7) Immediately before removing the protective materials from the leads of a replacement ESD device touch the protective material to the chassis or circuit assembly into which the device will be installed.

CAUTION : Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

- (8) Minimize bodily motions when handling unpackaged replacement ESD devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ESD device).

2. Reference Information

2-1 Component Descriptions

2-1-1 DVD ATAPI LOADER (RL-A700)

* D.C. Power Supply

A 4-pin shrouded, keyed male connector is used to provide the D.C. Power.
The pin assignment is described below.

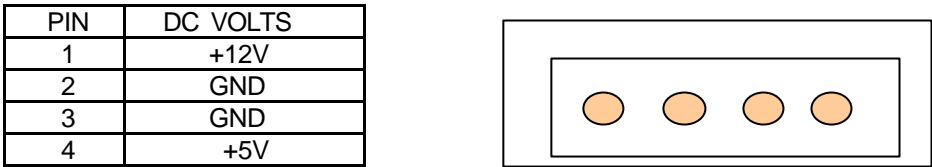
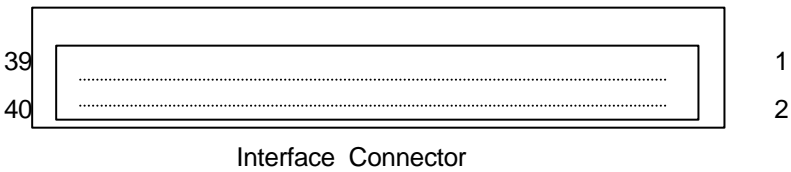


Figure-1 D.C. Power Connector

* Interface Connector

A 39-pin male, unshielded, shrouded, keyed connector are applied.
Please refer to Section 7-2-3 regarding its pin definition.



* Electrical Charateristics

1. Power

1-1. Voltage

- +5V DC with ± 5% tolerance, less than 100mVp-p Ripple Voltage
- +12V DC with ± 10% tolerance, less than 150mVp-p Ripple Voltage

1-2. Current

Continuous Reading

- | | |
|---------|-----------------|
| +5V DC | 500mA (Average) |
| +12V DC | 300mA (Average) |

Seeking & Spin up

- | | |
|---------|-----------------|
| +5V DC | 0.8 A (Maximum) |
| +12V DC | 1.5 A (Maximum) |

2. Signal Summary

The physical interface consists of single ended TTL compatible receivers.

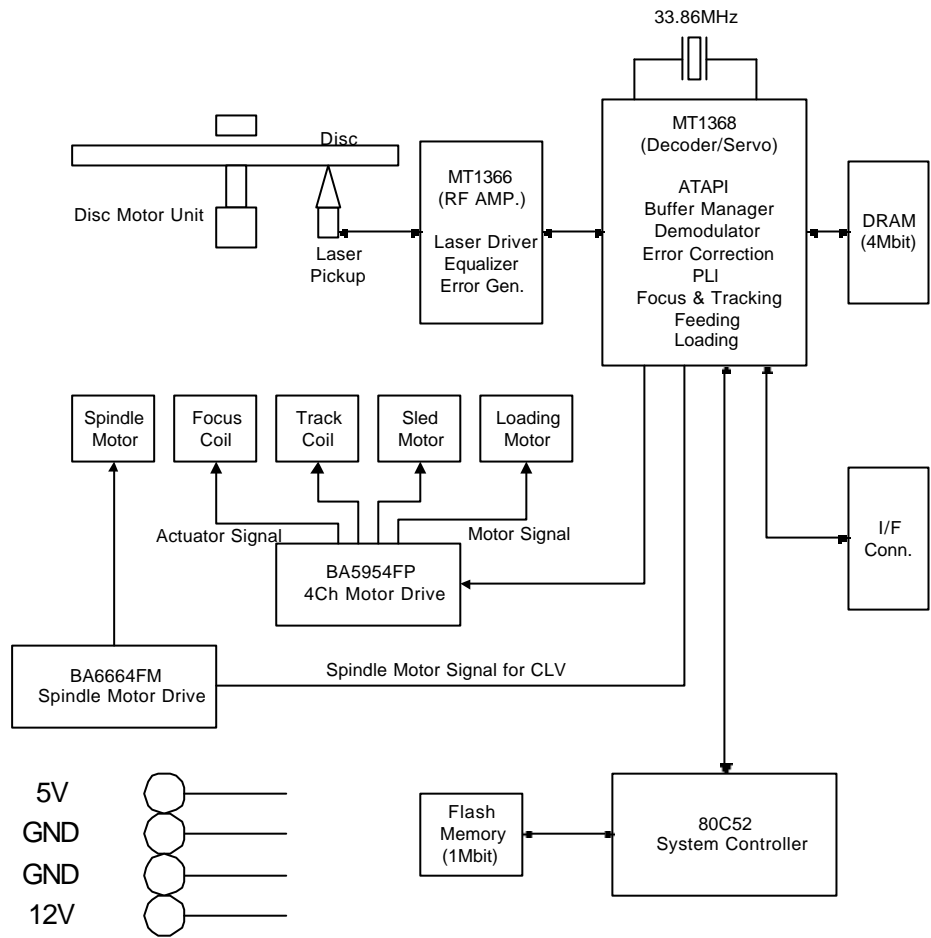
Component Descriptions

3. Connector Pin Definition

Signal	Pin	I/O	Description
CS0	37	I	Chip select 0
CS1	38	I	Chip select 1
DA0	35	I	Device address bit 0
DA1	33	I	Device address bit 1
DA2	36	I	Device address bit 2
DASP	39	I/O	Device active or slave (device 1) present
DD0	17	I/O	Data bus bit 0
DD1	15	I/O	Data bus bit 1
DD2	13	I/O	Data bus bit 2
DD3	11	I/O	Data bus bit 3
DD4	9	I/O	Data bus bit 4
DD5	7	I/O	Data bus bit 5
DD6	5	I/O	Data bus bit 6
DD7	3	I/O	Data bus bit 7
DD8	4	I/O	Data bus bit 8
DD9	6	I/O	Data bus bit 9
DD10	8	I/O	Data bus bit 10
DD11	10	I/O	Data bus bit 11
DD12	12	I/O	Data bus bit 12
DD13	14	I/O	Data bus bit 13
DD14	16	I/O	Data bus bit 14
DD15	18	I/O	Data bus bit 15
DIOR	25	I	I/O read
DIOW_	23	I	I/O write
DMARK_	29	I	DMA acknowledge
DMARQ_	21	O	DMA request
INTRQ	31	O	Interrupt request
AOCS16	32	O	I/O device 16-bit
IORDY	27	O	I/O ready
PDIAG_	34	I/O	Passed diagnostics
RESET_	1	I	Reset
CSEL	28		Cable select
KEY PIN	20		Key pin
GND	2,19,22,24,26,30,40		

Component Descriptions

*Appendix 1. DSL-710A Block Diagram



*Appendix 2. Key-Components List

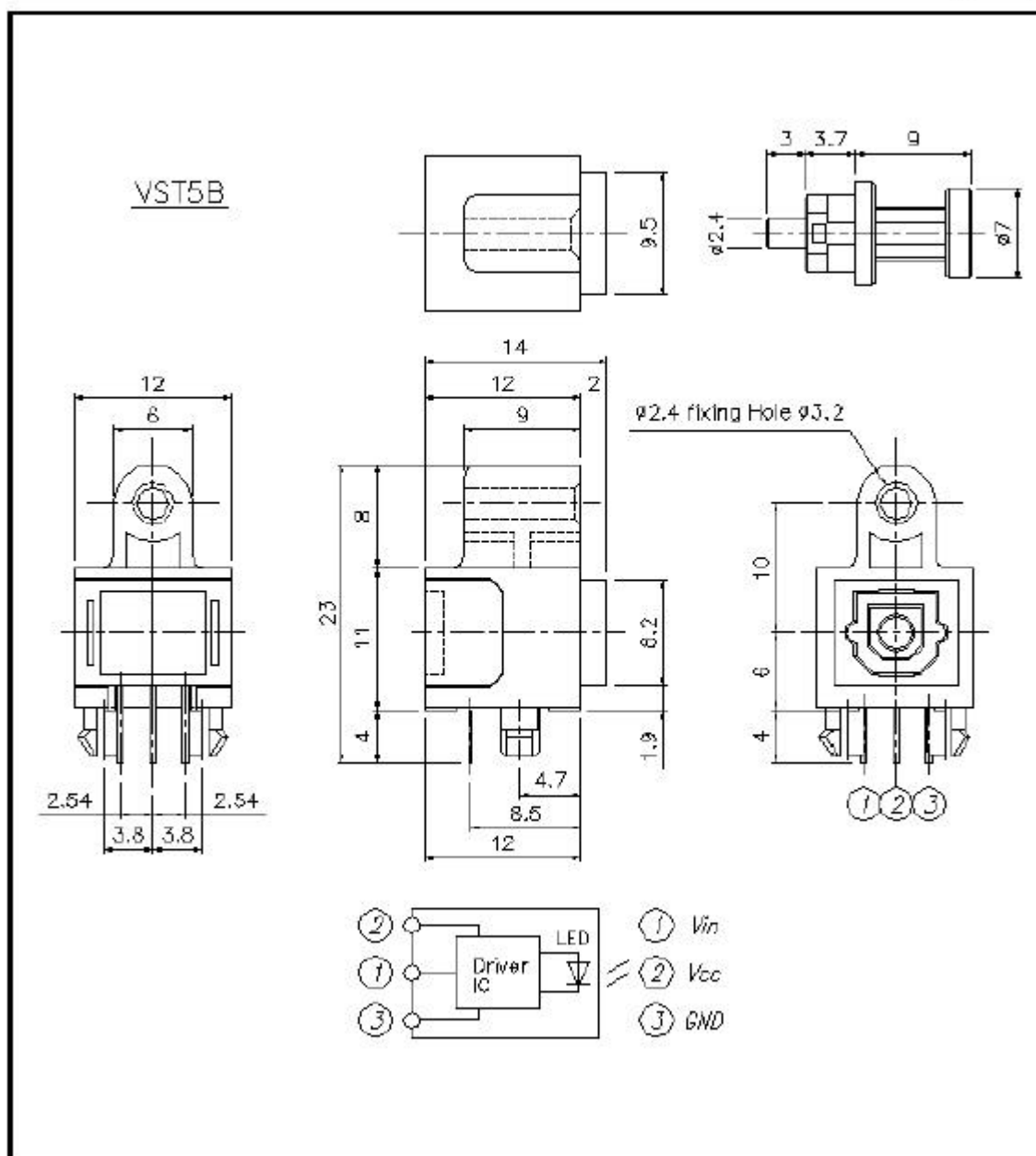
ITEM	Model Name	MAKER
Laser Pickup	SF-HD6AVS	Sanyo Electric
Spindle Motor	RSM-2811G	Samhongsa
Feeding Motor	RF-300CA-11440	Mabuchi
Loading Motor	RF-300CA-11440	Mabuchi
Decoder IC	M5705	Ali
RF Amp IC	SP3721A	Ali
Actuator & Motor Drive IC	BA5954FP	Rohm
Spindle Motor Drive IC	BA6664FM	Rohm

Component Descriptions

2-1-2 Fiber Optic Transmitting Module for Digital Audio Equipments (VST5B)

OUTLINE DIMENSIONS

Unit [mm]



* Recommended Operating Conditions

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	Vcc	4.75	5.0	5.25	V
High Level Input Voltage	VIH	2.0	-	Vcc	V
Low Level Input Voltage	VIL	0	-	0.8	V

2-1-3 NTSC/PAL Digital Video Encoder (AD7170)

FEATURES

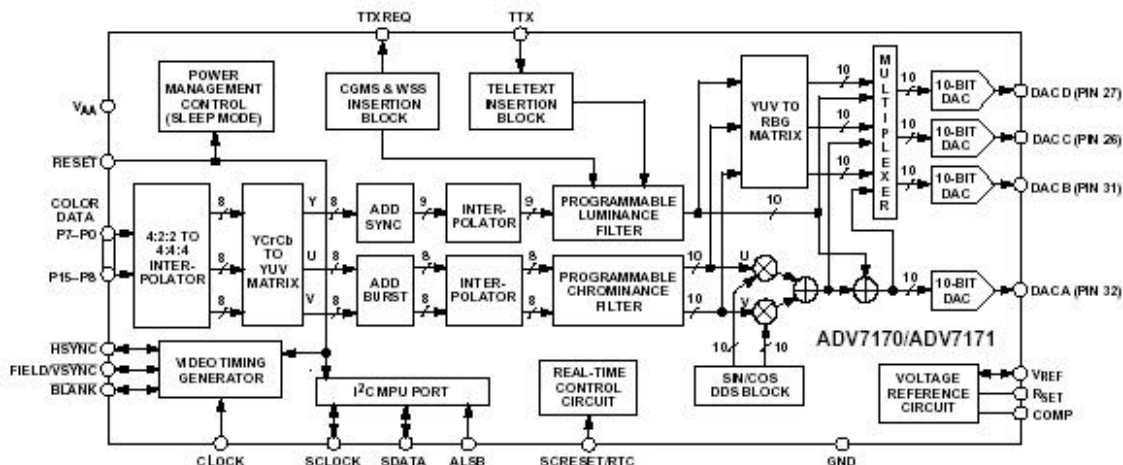
ITU-R BT601/656 YCrCb to PAL/NTSC Video Encoder
 High Quality 10-Bit Video DACs
 SSAF (Super Sub-Alias Filter)
 Advanced Power Management Features
 CGMS (Copy Generation Management System)
 WSS (Wide Screen Signalling)
 Simultaneous Y, U, V, C Output Format
 NTSC-M, PAL-M/N, PAL-B/D/G/H/I, PAL-60
 Single 27 MHz Clock Required ($\times 2$ Oversampling)
 80 dB Video SNR
 32-Bit Direct Digital Synthesizer for Color Subcarrier
 Multistandard Video Output Support:
 Composite (CVBS)
 Component S-Video (Y/C)
 Component YUV and RGB
 EuroSCART Output (RGB + CVBS/LUMA)
 Component YUV + CHROMA
 Video Input Data Port Supports:
 CCIR-656 4:2:2 8-Bit Parallel Input Format
 4:2:2 16-Bit Parallel Input Format
 SMPTE 170M NTSC-Compatible Composite Video
 ITU-R BT.470 PAL-Compatible Composite Video
 Programmable Simultaneous Composite
 and S-Video or RGB (SCART)/YUV Video Outputs
 Programmable Luma Filters (Low-Pass (PAL/NTSC))
 Notch, Extended (SSAF, CIF and QCIF)

Programmable Chroma Filters (Low-Pass [0.65 MHz,
 1.0 MHz, 1.2 MHz and 2.0 MHz], CIF and QCIF)
 Programmable VBI (Vertical Blanking Interval)
 Programmable Subcarrier Frequency and Phase
 Programmable LUMA Delay
 Individual ON/OFF Control of Each DAC
 CCIR and Square Pixel Operation
 Integrated Subcarrier Locking to External Video Source
 Color Signal Control/Burst Signal Control
 Interlaced/Noninterlaced Operation
 Complete On-Chip Video Timing Generator
 Programmable Multimode Master/Slave Operation
 Macrovision AntiTaping Rev 7.01 (ADV7170 Only)**
 Closed Captioning Support
 Teletext Insertion Port (PAL-WST)
 On-Board Color Bar Generation
 On-Board Voltage Reference
 2-Wire Serial MPU Interface (I²C[®] Compatible and Fast I²C)
 Single Supply +5 V or +3.3 V Operation
 Small 44-Lead PQFP/TQFP Packages

APPLICATIONS

High Performance DVD Playback Systems, Portable
 Video Equipment Including Digital Still Cameras and
 Laptop PCs, Video Games, PC Video/Multimedia and
 Digital Satellite/Cable Systems (Set-Top Boxes/IRD)

FUNCTIONAL BLOCK DIAGRAM

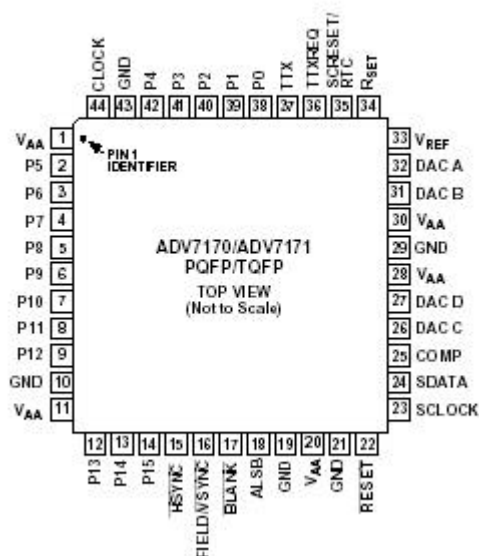


Component Descriptions

5 V SPECIFICATIONS ($V_{AA} = +5\text{ V} \pm 5\%$ ¹, $V_{REF} = 1.235\text{ V}$, $R_{SET} = 150\ \Omega$. All specifications T_{MIN} to T_{MAX} ² unless otherwise noted.)

Parameter	Conditions ¹	Min	Typ	Max	Units
STATIC PERFORMANCE					
Resolution (Each DAC)				10	Bits
Accuracy (Each DAC)			± 0.6		LSB
Integral Nonlinearity	$R_{SET} = 300\ \Omega$			± 1	LSB
Differential Nonlinearity	Guaranteed Monotonic				
DIGITAL INPUTS					
Input High Voltage, V_{INH}		2			V
Input Low Voltage, V_{INL}				0.8	V
Input Current, I_{IN}	$V_{IN} = 0.4\text{ V}$ or 2.4 V			± 1	μA
Input Capacitance, C_{IN}			10		pF
DIGITAL OUTPUTS					
Output High Voltage, V_{OH}	$I_{SOURCE} = 400\ \mu\text{A}$	2.4			V
Output Low Voltage, V_{OL}	$I_{SINK} = 3.2\text{ mA}$			0.4	V
Three-State Leakage Current				10	μA
Three-State Output Capacitance			10		pF
ANALOG OUTPUTS					
Output Current ³	$R_{SET} = 150\ \Omega$, $R_L = 37.5\ \Omega$	33	34.7	37	mA
Output Current ⁴	$R_{SET} = 1041\ \Omega$, $R_L = 262.5\ \Omega$		5		mA
DAC-to-DAC Matching			1.5		%
Output Compliance, V_{OC}		0		+1.4	V
Output Impedance, R_{OUT}			30		k Ω
Output Capacitance, C_{OUT}	$I_{OUT} = 0\text{ mA}$			30	pF
VOLTAGE REFERENCE					
Reference Range, V_{REF}	$I_{VREFOUT} = 20\ \mu\text{A}$	1.142	1.235	1.327	V
POWER REQUIREMENTS ⁵					
V_{AA}		4.75	5.0	5.25	V
Normal Power Mode					
$I_{DAC}(\text{max})$ ⁶	$R_{SET} = 150\ \Omega$, $R_L = 37.5\ \Omega$		150	155	mA
$I_{DAC}(\text{min})$ ⁶	$R_{SET} = 1041\ \Omega$, $R_L = 262.5\ \Omega$		20		mA
I_{CCT} ⁷			75	90	mA
Low Power Mode					
$I_{DAC}(\text{max})$ ⁶			80		mA
$I_{DAC}(\text{min})$ ⁶			20		mA
I_{CCT} ⁷			75	90	mA
Sleep Mode					
I_{DAC} ⁸			0.1		μA
I_{CCT} ⁹			0.001		μA
Power Supply Rejection Ratio	COMP = 0.1 μF		0.01	0.5	%/%

PIN CONFIGURATIONS



PIN FUNCTION DESCRIPTIONS

Mnemonic	Input/ Output	Function
P15–P0	I	8-Bit 4:2:2 Multiplexed YCrCb Pixel Port (P7–P0) or 16-Bit YCrCb Pixel Port (P15–P0). P0 represents the LSB.
CLOCK	I	TTL Clock Input. Requires a stable 27 MHz reference Clock for standard operation. Alternatively, a 24.52 MHz (NTSC) or 29.5 MHz (PAL) can be used for square pixel operation.
HSYNC	I/O	HSYNC (Modes 1 and 2) Control Signal. This pin may be configured to output (Master Mode) or accept (Slave Mode) Sync signals.
FIELD/VSYNC	I/O	Dual Function FIELD (Mode 1) and VSYNC (Mode 2) Control Signal. This pin may be configured to output (Master Mode) or accept (Slave Mode) these control signals.
BLANK	I/O	Video Blanking Control Signal. The pixel inputs are ignored when this is Logic Level “0.” This signal is optional.
SCRESET/RTC	I	This pin can be configured as an input by setting MR22 and MR21 of Mode Register 2. It can be configured as a subcarrier reset pin, in which case a high-to-low transition on this pin will reset the subcarrier to Field 0. Alternatively, it may be configured as a Real-Time Control (RTC) input.
V _{REF}	I/O	Voltage Reference Input for DACs or Voltage Reference Output (1.235 V).
R _{SET}	I	A 150 Ω resistor connected from this pin to GND is used to control full-scale amplitudes of the video signals.
COMP	O	Compensation Pin. Connect a 0.1 μF Capacitor from COMP to V _{AA} . For Optimum Dynamic Performance in low power mode, the value of the COMP capacitor can be lowered to as low as 2.2 nF.
DAC A	O	PAL/NTSC Composite Video Output. Full-Scale Output is 180 IRE (1286 mV) for NTSC and 1300 mV for PAL.
DAC C	O	RED/S-Video C/V Analog Output.
DAC D	O	GREEN/S-Video Y/Y Analog Output
DAC B	O	BLUE/Composite/U Analog Output.
SCLOCK	I	MPU Port Serial Interface Clock Input.
SDATA	I/O	MPU Port Serial Data Input/Output.
ALSB	I	TTL Address Input. This signal set up the LSB of the MPU address.
RESET	I	The input resets the on chip timing generator and sets the ADV7170/ADV7171 into default mode. This is NTSC operation, Timing Slave Mode 0, 8 Bit Operation, 2 × Composite and S Video out and DAC B powered ON and DAC D powered OFF.
TTX/V _{AA}	I	Teletext Data/Defaults to V _{AA} when Teletext not Selected (enables backward compatibility to ADV7175/ADV7176).
TTXREQ/GND	O	Teletext Data Request Signal/ Defaults to GND when Teletext not Selected (enables backward compatibility to ADV7175/ADV7176).
V _{AA}	P	Power Supply (+3 V to +5 V).
GND	G	Ground Pin.

2-1-4 DVD Processor Chip (Swan-2™ ES4318)

* Features

- Single-chip DVD video decoder in a 208-pin PQFP package
- Supports MPEG-1 system and MPEG-2 program streams
- Programmable multimedia processor architecture
- Compatible with Audio CD, Video CD, VCD 3.0, and Super Video CD(SVCD)
- DVD Navigation 1
- Built-in Content Scrambling System(CSS)

- Audio

- Built-in Karaoke key-shift function
- Dolby™ Digital 2-channel downmix audio output for Dolby™
- Dolby Pro Logic
- Linear PCM streams for 24 bit / 96KHz
- Concurrent S/PDIF out and 2-channel audio output
- Sensaura Dolby Digital Virtual Surround
- DTS Digital Surround 2-channel downmix stereo output
- S/PDIF output for encoded AC-3, DTS Digital output or Linear PCM

- Peripheral

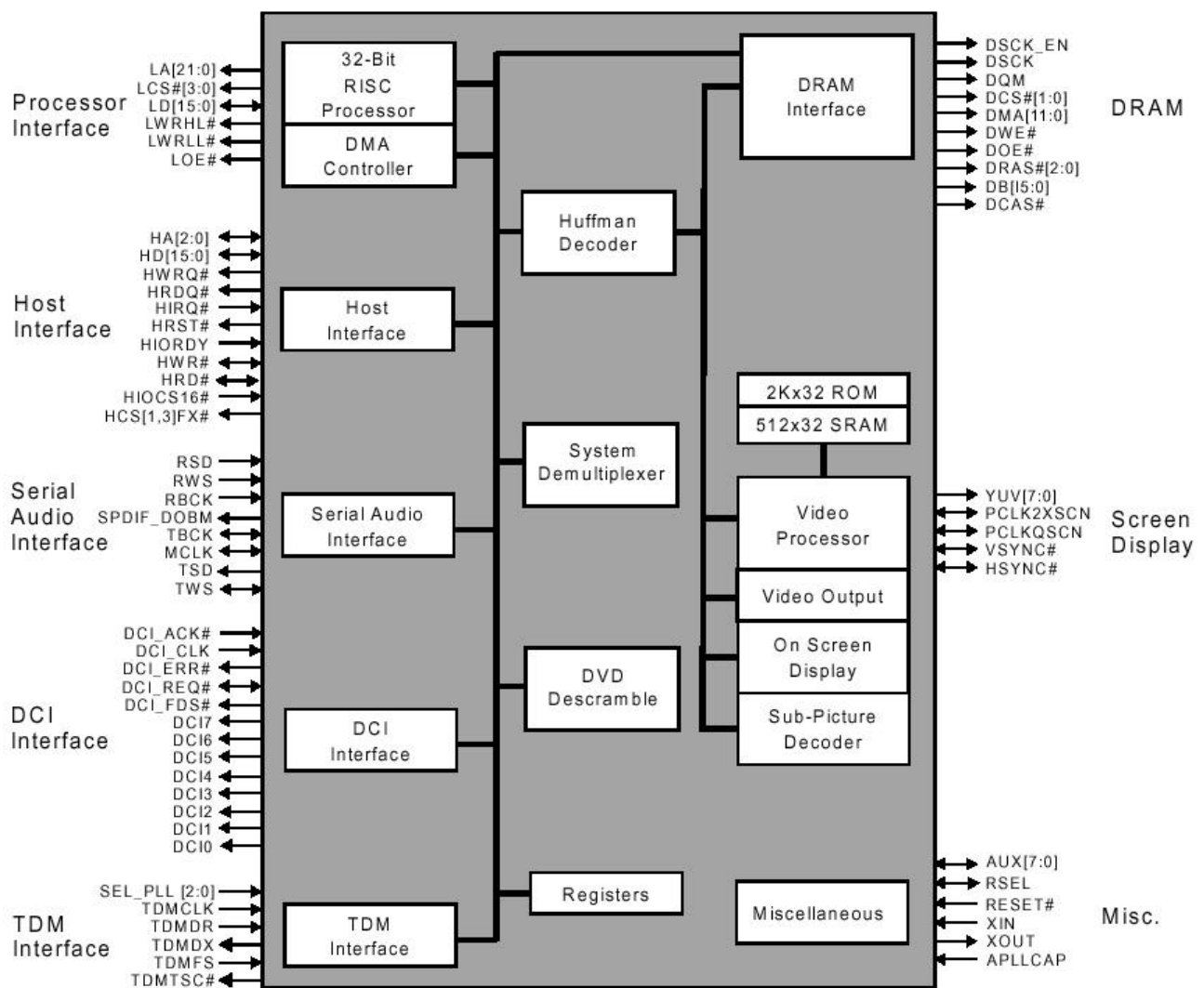
- Glueless interface to DVD loaders (ATAPI or A/V bus I/F)
- Bidirectional I²C audio interface
- Direct servo / loader interface
- 8 general-purpose auxiliary ports
- Single 27MHz clock input

- Smart Technology

- SmartZoom™ for motion zoom & pan
- SmartScale™ for NTSC to PAL conversion and vice versa
- SmartStream™ for video error concealment

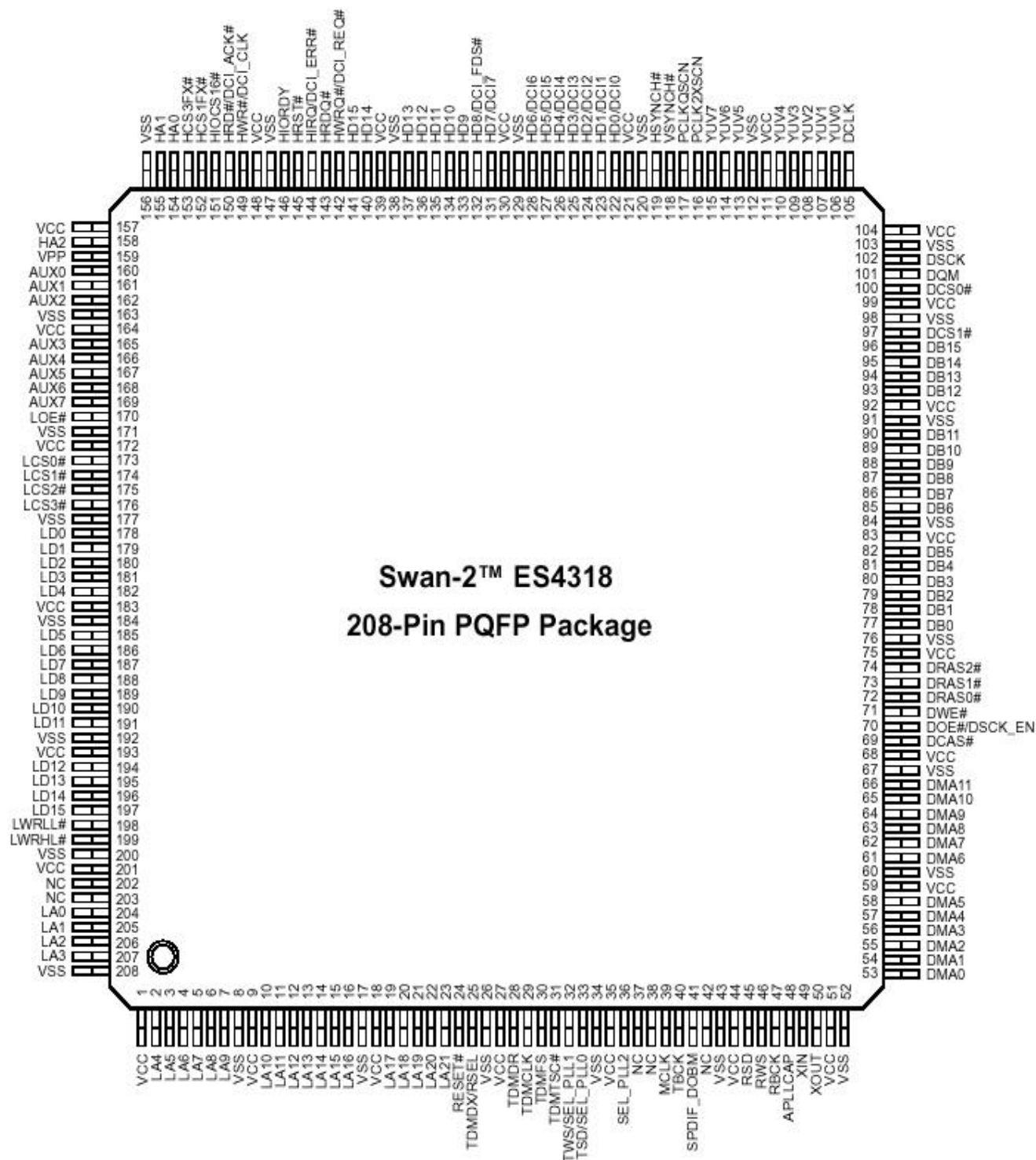
Component Descriptions

*Functional Description



Component Descriptions

* Pinout Diagram



Component Descriptions

*Pin Description

Name	Number	I/O	Definition
VCC	1, 9, 18, 27, 35, 44, 51, 59, 68, 75, 83, 92, 99, 104, 111, 121, 130, 139, 148, 157, 164, 172, 183, 193, 201	I	3.65 V \pm 150 mv.
LA[21:0]	23:19, 16:10, 7:2, 207:204	O	Device address output.
VSS	8, 17, 26, 34, 43, 52, 60, 67, 76, 84, 91, 98, 103, 112, 120, 129, 138, 147, 156, 163, 171, 177, 184, 192, 200, 208	I	Ground.
RESET#	24	I	Reset input, active low.
TDMDX		O	TDM transmit data
RSEL	25	I	ROM Select RSEL Selection 0 16-bit ROM 1 8bit ROM
TMDR	28	I	TDM receive data.
TDMCLK	29	I	TDM clock input.
TDMFS	30	I	TDM frame synch.
TDMTSC#	31	O	TDM output enable, active low.
TWS	32	O	Audio transmit frame sync.
SEL_PLL1		I	Select PLL1.
TSD SEL_PLL0	33	O I	Audio transmit serial data port. Select PLL0. SEL_PLL2 SEL_PLL0 Clock Output 0 0 2.5 x DCLK 0 1 3 x DCLK 1 0 3.5 x DCLK 1 1 4 x DCLK
SEL_PLL2	36		Select PLL2. See the table for pin number 33.
MCLK	39	I/O	Audio master clock for audio DAC.
TBCK	40	I/O	Audio transmit bit clock.
SDIF_DOBM	41	O	S/PDIF (IEC958) Format Output.
RSD	45	I	Audio receive serial data.
RWS	46	I	Audio receive frame synch.
RBCK	47	I	Audio receive bit clock.
APLLCAP	48	I	Analog PLL Capacitor.
XIN	49	I	Crystal input.
XOUT	50	O	Crystal output.
DMA[11:0]	66:61, 58:53	O	DRAM address bus.
DCAS#	69	O	Column address strobe, active low.
DOE#	70	O	Output enable, active low.
DSCK_EN		I	Clock enable, active low.
DWE#	71	O	DRAM write enable, active low.
DRAS[2:0]#	74:72	O	Row address strobe, active low.
DB[15:0]	96:93, 90:85, 82:77	I/O	DRAM data bus.
DCS[1:0]#	97, 100	O	SDRAM chip select [1:0], active low.
DQM	101	O	Data input / output mask.
DSCK	102	O	Clock to SDRAM.
DCLK	105	I	Clock Input(27MHz).
YUV[7:0]	115:113, 110:106	O	8-bit YUV output.
PCLK2XSCN	116	I/O	2X pixel clock.
PCLKQSCN	117	I/O	Pixel clock.
1. VSY NC H#	118	I/O	Vertical synch for screen video interface, programmable for rising or falling edge, active low.

Component Descriptions

Name	Number	I/O	Definition
HSYNCH#	119	I/O	Horizontal synch for screen video interface, programmable for rising or falling edge, active low.
HD[15:0]	141:140, 137:131, 128:122	O	Host data bus
HCS1FX#	152	O	Host select 1.
HCS3FX#	153	O	Host select 3.
HIOCS16#	151	I	Device 16-bit data transfer.
HA[2:0]	158, 155:154	I/O	Host address bus.
VPP	159	I	Peripheral protection voltage.
HWR#/DCI_ACK#	149	I,I	Host write/DCI Interface Acknowledge Signal, active low.
HRD#/DCI_CLK	150	I,I	Host read/DCI Interface Clock.
HD[15:0]	141:140, 137:131, 128:122	I/O	Host data bus.
HWRQ#	142	O	Host write request.
HRDQ#	143	O	Host read request.
HIRQ	144	I/O	Host interrupt.
HRST#	145	O	Host reset.
HIORDY	146	I	Host I/O ready
HWR#	149	O	Host write request.
AUX[7:0]	169:165, 162:160	I/O	Auxiliary ports.
LOE#	170	O	Device output enable, active low.
LCS[3:0]#	176:173	O	Chip select[3:0], active low.
LD[15:0]	197:194, 191:185, 182:178	I/O	Device data bus.
LWRLL#	198	O	Device write enable, active low.
LWRHL#	199	O	Device write enable, active low.
NC	37, 38, 42, 203:202		No Connect pins. Leave open

2-1-5 DIGITAL-TO-ANALOG STEREO AUDIO CONVERTER (CS4391)

24-Bit, 192 kHz Stereo DAC with Volume Control

Features

- Complete Stereo DAC System: Interpolation, D/A, Output Analog Filtering
- 108 dB Dynamic Range
- 94 dB THD+N
- Direct Stream Digital Mode
- Low Clock Jitter Sensitivity
- +5 V to +3 V Power Supply
- ATAPI Mixing
- On-Chip Digital De-emphasis for 32, 44.1, and 48 kHz
- Volume Control with Soft Ramp
 - 119 dB Attenuation
 - 1 dB Step Size
 - Zero Crossing Click-Free Transitions
- 36 mW with 3 V supply
- Direct Interface with 5 V to 1.8 V Logic

Description

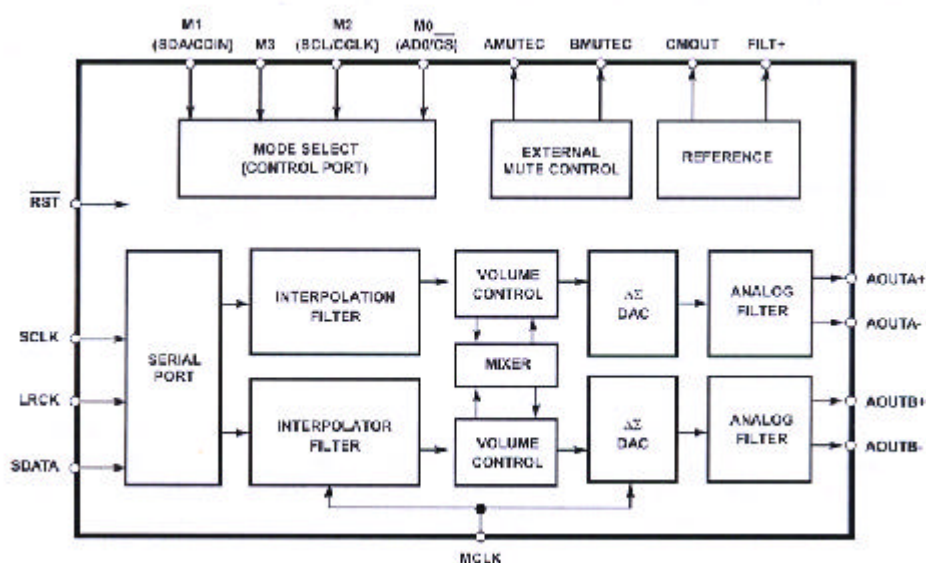
The CS4391 is a complete stereo digital-to-analog system including digital interpolation, fourth-order delta-sigma digital-to-analog conversion, digital de-emphasis, volume control, channel mixing and analog filtering. The advantages of this architecture include: ideal differential linearity, no distortion mechanisms due to resistor matching errors, no linearity drift over time and temperature and a high tolerance to clock jitter.

The CS4391 accepts PCM data at sample rates from 2 kHz to 192 kHz, DSD audio data, consumes very little power and operates over a wide power supply range. These features are ideal for DVD, A/V receivers, CD and set-top box systems.

ORDERING INFORMATION

CS4391-KZ	20-pin TSSOP	-10 to 70 °C
CDB4391	Evaluation Board	

* Block Diagram



5. PIN DESCRIPTION - PCM DATA MODE

Reset	$\overline{\text{RST}}$	1	20	AMUTEC	Channel A Mute Control
Logic Voltage	VL	2	19	AOUTA-	Differential Output
Serial Data	SDATA	3	18	AOUTA+	Differential Output
Serial Clock	SCLK	4	17	VA	Analog Power
Left/Right Clock	LRCK	5	16	AGND	Analog Ground
Master Clock	MCLK	6	15	AOUTB+	Differential Output
	M3	7	14	AOUTB-	Differential Output
	(SCL/CCLK) M2	8	13	BMUTEC	Channel B Mute Control
	(SDA/CDIN) M1	9	12	CMOUT	Common Mode Voltage
	(AD0/CS) M0	10	11	FILT+	Positive Voltage Reference

Serial Clock - SCLK

Pin 4, Input

Function:

Clocks the individual bits of the serial data into the SDATA pin. The required relationship between the Left/Right clock, serial clock and serial data is defined by the Mode Control Byte in Control Port Mode or the Mode pins in Hardware Mode. The options are detailed in Figures 6-24.

Left / Right Clock - LRCK

Pin 5, Input

Function:

The Left / Right clock determines which channel is currently being input on the serial audio data input, SDATA. The frequency of the Left/Right clock must be at the input sample rate. Audio samples in Left/Right sample pairs will be simultaneously output from the digital-to-analog converter whereas Right/Left pairs will exhibit a one sample period difference. The required relationship between the Left/Right clock, serial clock and serial data is defined by the Mode Control Byte in Control Port Mode or the Mode pins in Stand-alone Mode. The options are detailed in Figures 6-24.

Master Clock - MCLK

Pin 6, Input

Function:

The master clock frequency must be either 256x, 384x, 512x, 768x or 1024x the input sample rate in Single Speed Mode; either 128x, 192x 256x, 384x or 512x the input sample rate in Double Speed Mode; or 64x, 96x 128x, 192x or 256 x the input sample rate in Quad Speed Mode. Tables 8-10 illustrate the standard audio sample rates and the required master clock frequencies.

Note: These clocking ratios are only available in Control Port Mode when the MCLK Divide bit is enabled.

Mode Select - M3, M2, M1 and M0 (Stand-alone Mode)

Pins 7, 8, 9 and 10 Inputs

Function:

The Mode Select Pins, M0-M3, select the operational mode of the device as detailed in Tables 11-15.

Mode Select - M3 (Control Port Mode)

Pin 7, Input

Function:

The Mode Select Pin, M3, is not used in PCM Control Port mode and should be terminated to ground.

Component Descriptions

Serial Control Interface Clock - SCL/CCLK (Control Port Mode)

Pin 8, Input

Function:

Clocks the serial control data into or from SDA/CDIN.

Serial Control Data I/O - SDA/CDIN (Control Port Mode)

Pin 9, Input/Output

Function:

In I²C mode, SDA is a data I/O line. CDIN is the input data line for the control port interface in SPI mode.

Address Bit / Chip Select - AD0 / $\overline{\text{CS}}$ (Control Port Mode)

Pin 10, Input

Function:

In I²C mode, AD0 is a chip address bit. $\overline{\text{CS}}$ is used to enable the control port interface in SPI mode. The device will enter the SPI mode at anytime a high to low transition is detected on this pin. Once the device has entered the SPI mode, it will remain until either the part is reset or undergoes a power-down cycle.

Positive Voltage Reference - FILT+

Pin 11, Output

Function:

Positive reference for internal sampling circuits. External capacitors are required from FILT+ to analog ground, as shown in Figure 5 and . The recommended values will typically provide 60 dB of PSRR at 1 kHz and 40 dB of PSRR at 60 Hz. FILT+ is not intended to supply external current. FILT+ has a typical source impedance of 250 k Ω and any current drawn from this pin will alter device performance.

Common Mode Voltage - CMOUT

Pin 12, Output

Function:

Filter connection for internal common mode reference voltage, typically 50% of V_A. Capacitors must be connected from CMOUT to analog ground, as shown in Figure 5. CMOUT is not intended to supply external current. CMOUT has a typical source impedance of 250 k Ω and any current drawn from this pin will alter device performance.

Channel A and Channel B Mute Control - AMUTEC and BMUTEC

Pins 13 and 20, Outputs

Function:

The Mute Control pins go high during power-up initialization, reset, muting, master clock to left/right clock frequency ratio is incorrect or power-down. These pins are intended to be used as a control for an external mute circuit to prevent the clicks and pops that can occur in any single supply system. Use of Mute Control is not mandatory but recommended for designs requiring the absolute minimum in extraneous clicks and pops.

Component Descriptions

Differential Analog Output - AOUTB+, AOUTB- and AOUTA+, AOUTA-

Pins 14, 15 and 18, 19, Outputs

Function:

The full scale differential analog output level is specified in the Analog Characteristics specifications table.

Analog Ground - AGND

Pin 16, Input

Function:

Analog ground reference.

Analog Power - VA

Pin 17, Input

Function:

Analog power supply. Typically 3 to 5 VDC.

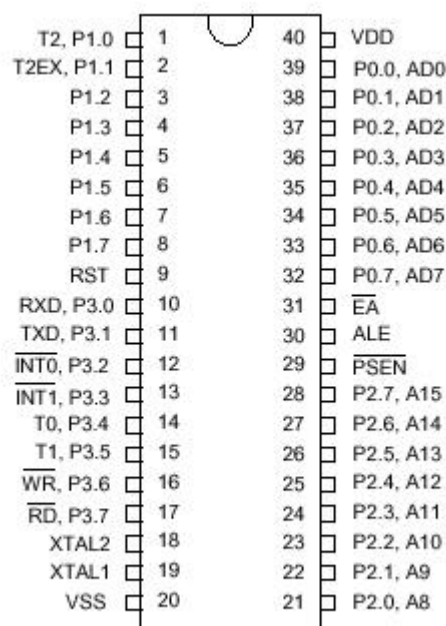
Component Descriptions

2-1-6 8-BIT MTP MICROCONTROLLER (W78LE52)

* Features

Fully static design 8-bit CMOS microcontroller
256 bytes of on-chip scratchpad RAM
8 KB electrically erasable/programmable MTP-ROM
64 KB program memory address space
64 KB data memory address space
Four 8-bit bi-directional ports
Three 16-bit timer/counters
One full duplex serial port(UART)
Watchdog Timer
Eight sources, two-level interrupt capability
EMI reduction mode
Built-in power management
Code protection mechanism
Packages : DIP 40: W78LE52-24

*Pin Configurations

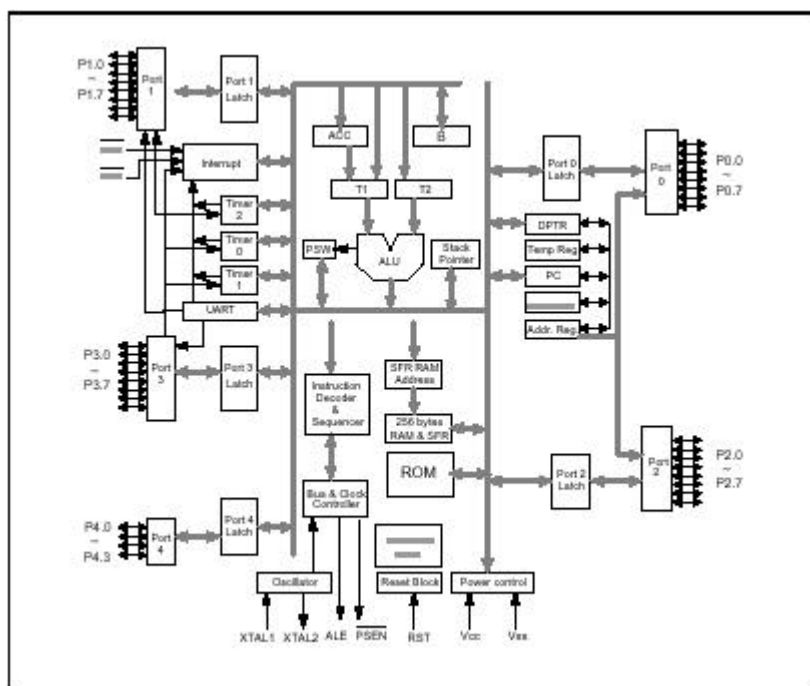


Component Descriptions

*Pin Description

SYMBOL	DESCRIPTIONS
EA#	EXTERNAL ACCESS ENABLE: This pin forces the processor to execute out of external ROM. It should be kept high to access internal ROM. The ROM address and data will not be presented on the bus if EA pin is high and the program counter is within on-chip ROM area.
PSEN#	PROGRAM STORE ENABLE: PSEN enables the external ROM data onto the Port 0 address/ data bus during fetch and MOVC operations. When internal ROM access is performed, no PSEN strobe signal outputs from this pin.
ALE	ADDRESS LATCH ENABLE: ALE is used to enable the address latch that separates the address from the data on Port 0.
RST	RESET: A high on this pin for two machine cycles while the oscillator is running resets the device.
XTAL1	CRYSTAL1: This is the crystal oscillator input. This pin may be driven by an external clock.
XTAL2	CRYSTAL2: This is the crystal oscillator output. It is the inversion of XTAL1.
VSS	GROUND: Ground potential
VDD	POWER SUPPLY: Supply voltage for operation.
P0.0 - P0.7	PORT 0: Port 0 is a bi-directional I/O port which also provides a multiplexed low order address/data bus during accesses to external memory. The pins of Port 0 can be individually configured to open-drain or standard port with internal pull-ups.
P1.0 - P1.7	PORT 1: Port 1 is a bi-directional I/O port with internal pull-ups. The bits have alternate functions which are described below: T2(P1.0): Timer/Counter 2 external count input T2EX(P1.1): Timer/Counter 2 Reload/Capture control
P2.0 - P2.7	PORT 2: Port 2 is a bi-directional I/O port with internal pull-ups. This port also provides the upper address bits for accesses to external memory.
P3.0 - P3.7	PORT 3: Port 3 is a bi-directional I/O port with internal pull-ups. All bits have alternate functions, which are described below: RXD(P3.0) : Serial Port receiver input TXD(P3.1) : Serial Port transmitter output INT0 (P3.2) : External Interrupt 0 INT1(P3.3) : External Interrupt 1 T0(P3.4) : Timer 0 External Input T1(P3.5) : Timer 1 External Input WR(P3.6) : External Data Memory Write Strobe RD(P3.7) : External Data Memory Read Strobe
P4.0 - P4.3	PORT 4: Another bit-addressable bidirectional I/O port P4. P4.3 and P4.2 are alternative function pins. It can be used as general I/O port or external interrupt input sources (INT2 / INT3).

* Block Diagram



*Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
DC Power Supply	VDD-VSS	-0.3	+7.0	V
Input Voltage	VIN	VSS -0.3	VDD +0.3	V
Operating Temperature	TA	0	70	°C
Storage Temperature	TST	-55	+150	°C

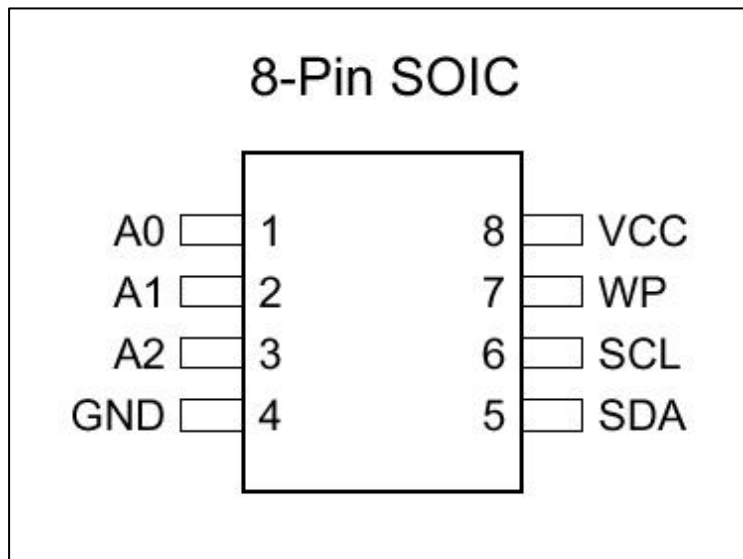
2-1-7 Serial EEPROM, 2K (256 x 8) (AT24C02)

* Features

- Low-Voltage and Standard-Voltage Operation
 - 5.0 (V_{CC} = 4.5V to 5.5V)
 - 2.7 (V_{CC} = 2.7V to 5.5V)
 - 2.5 (V_{CC} = 2.5V to 5.5V)
 - 1.8 (V_{CC} = 1.8V to 5.5V)
- Internally Organized 128 x 8 (1K), 256 x 8 (2K), 512 x 8 (4K), 1024 x 8 (8K) or 2048 x 8 (16K)
- 2-Wire Serial Interface
- Schmitt Trigger, Filtered Inputs for Noise Suppression
- Bidirectional Data Transfer Protocol
- 100 kHz (1.8V, 2.5V, 2.7V) and 400 kHz (5V) Compatibility
- Write Protect Pin for Hardware Data Protection
- 8-Byte Page (1K, 2K), 16-Byte Page (4K, 8K, 16K) Write Modes
- Partial Page Writes Are Allowed
- Self-Timed Write Cycle (10 ms max)
- High Reliability
 - Endurance: 1 Million Write Cycles
 - Data Retention: 100 Years
 - ESD Protection: >3000V
- Automotive Grade and Extended Temperature Devices Available
- 8-Pin and 14-Pin JEDEC SOIC, 8-Pin PDIP, 8-Pin MSOP, and 8-Pin TSSOP Packages

Component Descriptions

* Pin Configurations



* Pin Description

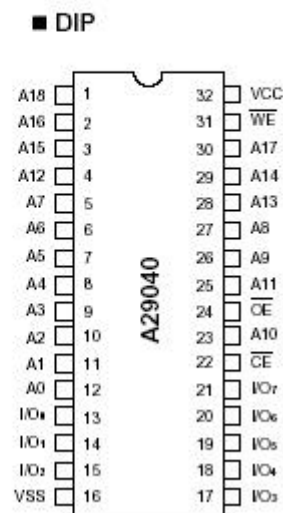
Pin Name	Function
A0 - A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect

2-1-8 512K Bit CMOS 5.0 Volt-only, Uniform Sector Flash Memory (A29040)

Features

- 5.0V \pm 10% for read and write operations
- Access times:
 - 55/70/90/120/150 (max.)
- Current:
 - 20 mA typical active read current
 - 30 mA typical program/erase current
 - 1 μ A typical CMOS standby
- Flexible sector architecture
 - 8 uniform sectors of 64 Kbyte each
 - Any combination of sectors can be erased
 - Supports full chip erase
 - Sector protection:
 - A hardware method of protecting sectors to prevent any inadvertent program or erase operations within that sector
- Embedded Erase Algorithms
 - Embedded Erase algorithm will automatically erase the entire chip or any combination of designated sectors and verify the erased sectors
 - Embedded Program algorithm automatically writes and verifies bytes at specified addresses
- Typical 100,000 program/erase cycles per sector
- 20-year data retention at 125°C
 - Reliable operation for the life of the system
- Compatible with JEDEC-standards
 - Pinout and software compatible with single-power-supply Flash memory standard
 - Superior inadvertent write protection
- Data Polling and toggle bits
 - Provides a software method of detecting completion of program or erase operations
- Erase Suspend/Erase Resume
 - Suspends a sector erase operation to read data from, or program data to, a non-erasing sector, then resumes the erase operation
- Package options
 - 32-pin P-DIP, PLCC, or TSOP(Forward type)

Pin Configurations



Component Descriptions

Absolute Maximum Ratings*

Ambient Operating Temperature -55°C to + 125°C
Storage Temperature -65°C to + 125°C
VCC to Ground -2.0V to 7.0V
Output Voltage (Note 1) -2.0V to 7.0V
A9 & \overline{OE} (Note 2) -2.0V to 12.5V
All other pins (Note 1) -2.0V to 7.0V
Output Short Circuit Current (Note 3) 200mA

Pin Descriptions

Pin No.	Description
A0 - A18	Address Inputs
I/O ₀ - I/O ₇	Data Inputs/Outputs
\overline{CE}	Chip Enable
\overline{WE}	Write Enable
\overline{OE}	Output Enable
VSS	Ground
VCC	Power Supply

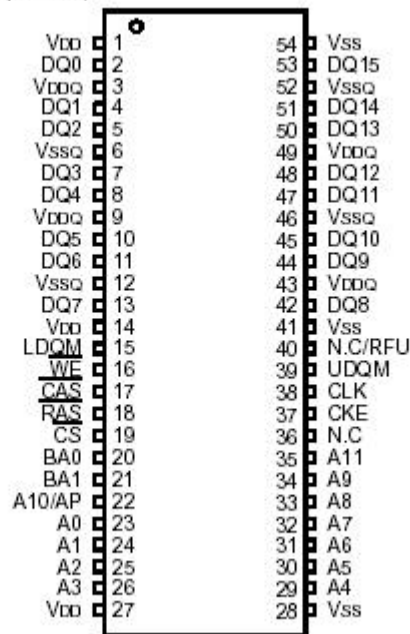
Component Descriptions

2-1-9 64MBit SDRAM 1MX 16BitX4Banks Synchronous DRAM LVTTTL (K4S641632D)

FEATURES

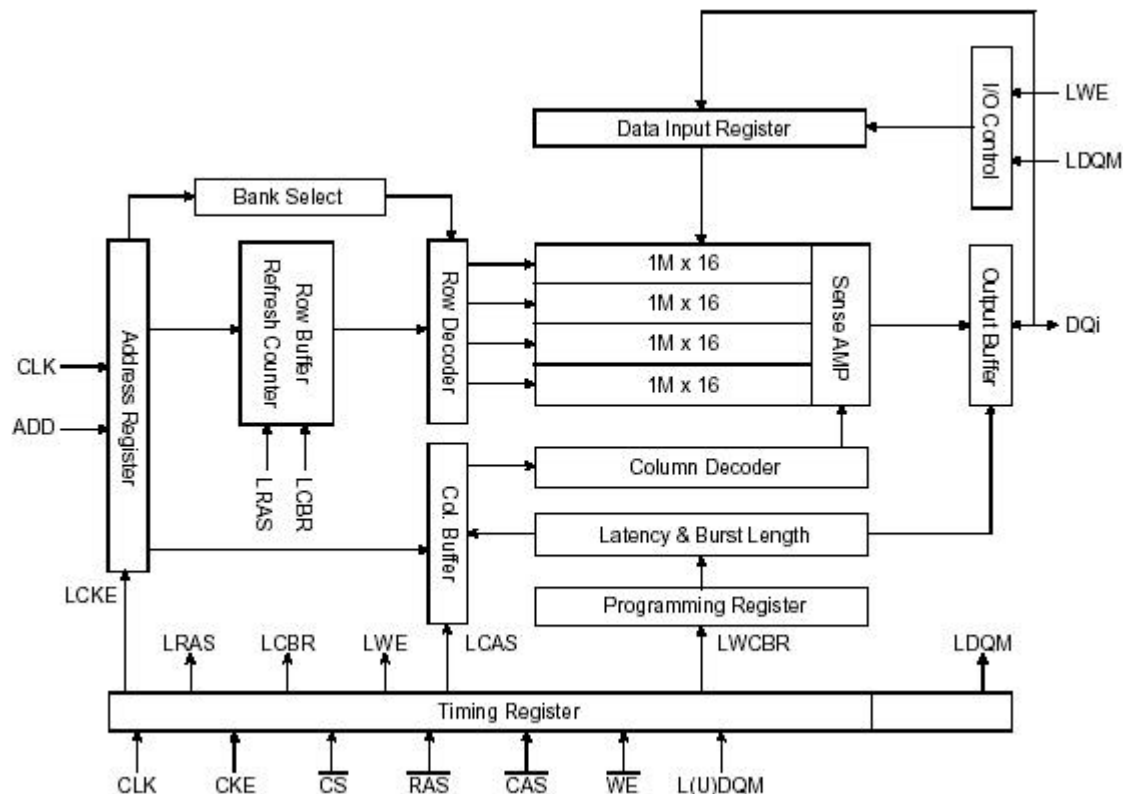
- JEDEC standard 3.3V power supply
- LVTTTL compatible with multiplexed address
- Four banks operation
- MRS cycle with address key programs
 - CAS latency (2 & 3)
 - Burst length (1, 2, 4, 8 & Full page)
 - Burst type (Sequential & Interleave)
- All inputs are sampled at the positive going edge of the system clock
- Burst read single-bit write operation
- DQM for masking
- Auto & self refresh
- 64ms refresh period (4K cycle)

PIN CONFIGURATION (Top view)



54Pin TSOP (II)
(400mil x 875mil)
(0.8 mm Pin pitch)

FUNCTIONAL BLOCK DIAGRAM



PIN FUNCTION DESCRIPTION

Pin	Name	Input Function
CLK	System clock	Active on the positive going edge to sample all inputs.
$\overline{\text{CS}}$	Chip select	Disables or enables device operation by masking or enabling all inputs except CLK, CKE and L(U)DQM
CKE	Clock enable	Masks system clock to freeze operation from the next clock cycle. CKE should be enabled at least one cycle prior to new command. Disable input buffers for power down in standby.
A ₀ – A ₁₁	Address	Row/column addresses are multiplexed on the same pins. Row address : RA ₀ – RA ₁₁ , Column address : CA ₀ – CA ₇
BA ₀ – BA ₁	Bank select address	Selects bank to be activated during row address latch time. Selects bank for read/write during column address latch time.
$\overline{\text{RAS}}$	Row address strobe	Latches row addresses on the positive going edge of the CLK with $\overline{\text{RAS}}$ low. Enables row access & precharge.
$\overline{\text{CAS}}$	Column address strobe	Latches column addresses on the positive going edge of the CLK with $\overline{\text{CAS}}$ low. Enables column access.
$\overline{\text{WE}}$	Write enable	Enables write operation and row precharge. Latches data in starting from $\overline{\text{CAS}}$, $\overline{\text{WE}}$ active.
L(U)DQM	Data input/output mask	Makes data output Hi-Z, tshz after the clock and masks the output. Blocks data input when L(U)DQM active.
DQ ₀ – 15	Data input/output	Data inputs/outputs are multiplexed on the same pins.
V _{DD} /V _{SS}	Power supply/ground	Power and ground for the input buffers and the core logic.
V _{DDQ} /V _{SSQ}	Data output power/ground	Isolated power supply and ground for the output buffers to provide improved noise immunity.
N.C./RFU	No connection /reserved for future use	This pin is recommended to be left No Connection on the device.

Component Descriptions

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Voltage on any pin relative to Vss	V _{IN} , V _{OUT}	-1.0 ~ 4.6	V
Voltage on VDD supply relative to Vss	VDD, VDDO	-1.0 ~ 4.6	V
Storage temperature	T _{STG}	-55 ~ +150	°C
Power dissipation	P _D	1	W
Short circuit current	I _{OS}	50	mA

3. Product Specifications

■ Playback System

DVD Video
Video CD (1.1, 2.0, 3.0)
SVCD and CVD
CDDA
CD-ROM with MP3 data

■ Television Signal System

NTSC/PAL

■ Video Performance

Video Out	1 Vpp / 75 ohm
S-Video Out	Y : 1 Vpp / 75 ohm C : 0.286 Vpp / 75 ohm
Component Out	0.7 Vpp / 75 ohm
D/A Converter	27MHz / 10bit

■ Audio Performance

Frequency Response	DVD : fs 48/96KHz, 4Hz ~ 2/44KHz Video CD : fs 44.1KHz, 4Hz~20KHz Audio CD : fs 44.1KHz, 4Hz~20KHz
Output Level	Analog : 2Vrms (1 KHz) Digital : 1.15 Vpp
D/A Converter	96KHz/24bit
S/N Ratio	110 dB

Product Specifications

■ Connections

Coaxial digital audio out	X1
Optical digital audio out	X1
Audio Analog out for 2-channel	X1
Component Video	X1
Composite Video out	X1
S-Video out	X1

■ Power Supply

Power Source	AC 100~240V, 50/60Hz
Power Consumption	< 20 Watt

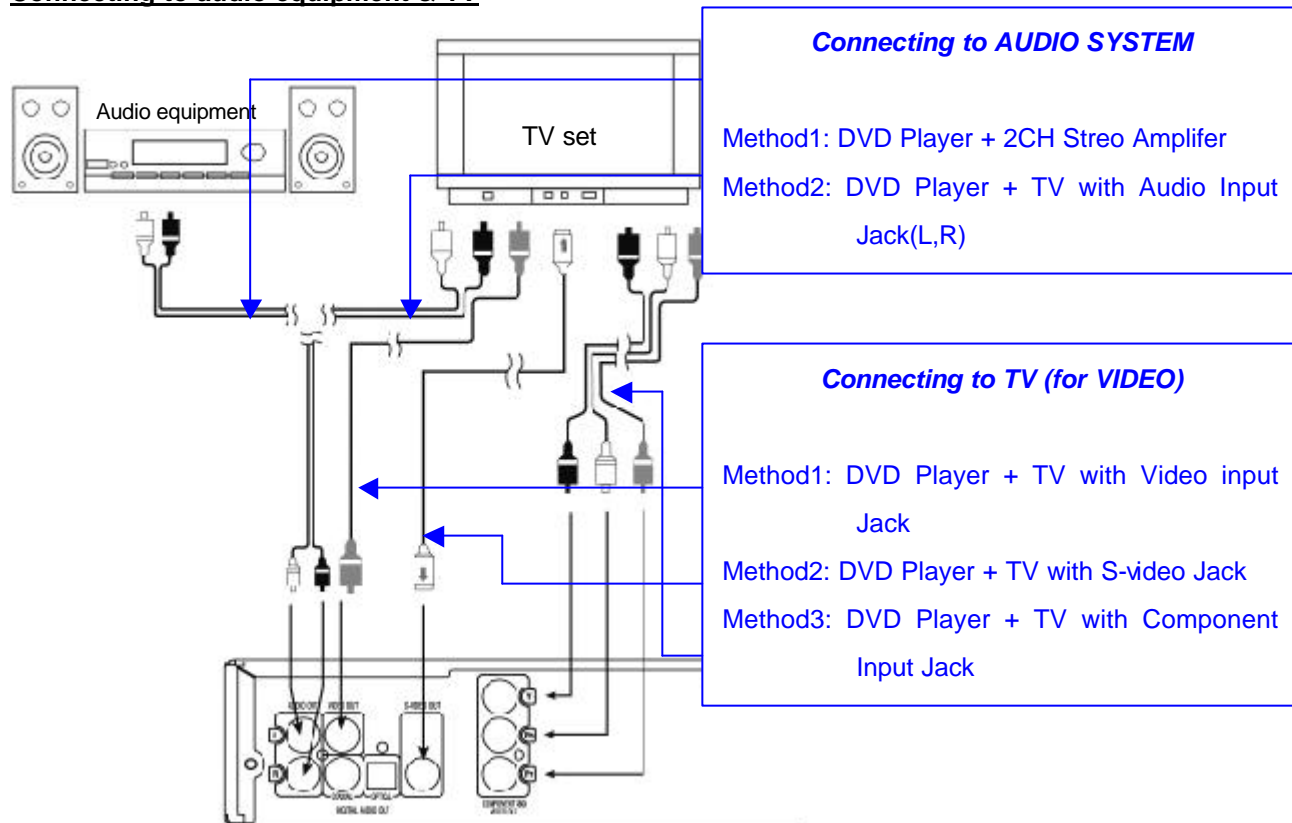
■ Set

Dimensions (W X H X D)	440 X 60 X 270 (mm)
Net Weight	3.2 Kg
Gross Weight	4 Kg

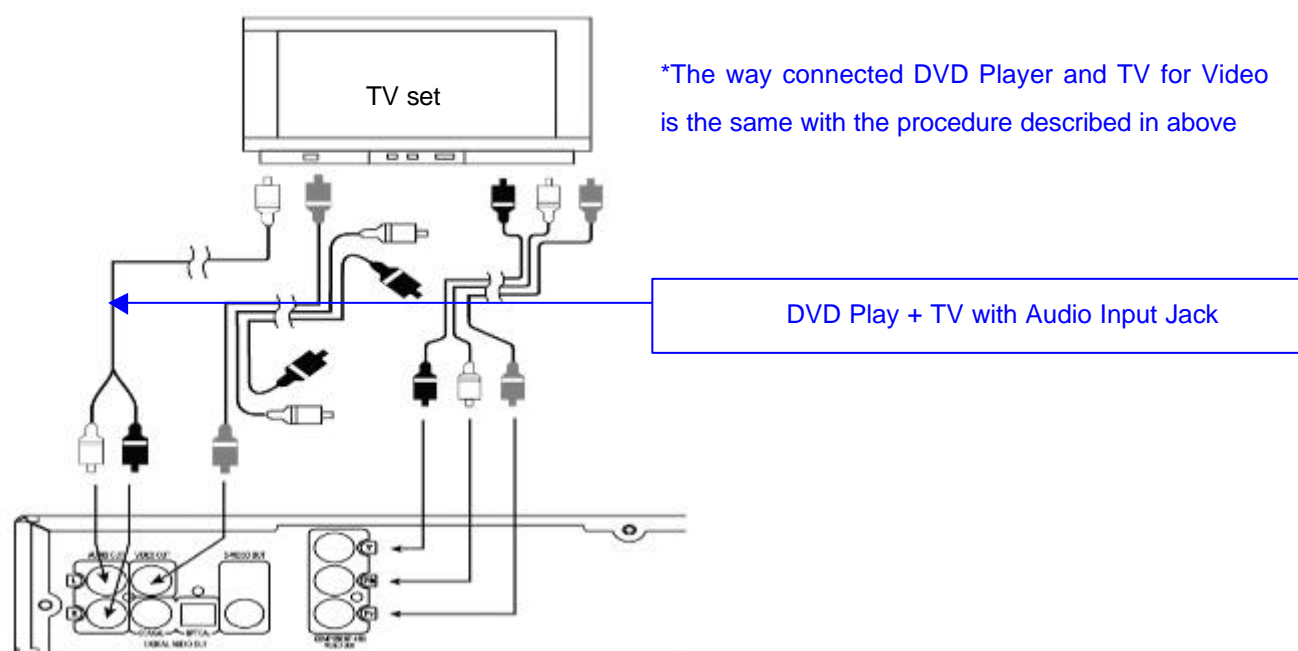
4. Operating Instructions

4-1 Basic Connections

Connecting to audio equipment & TV

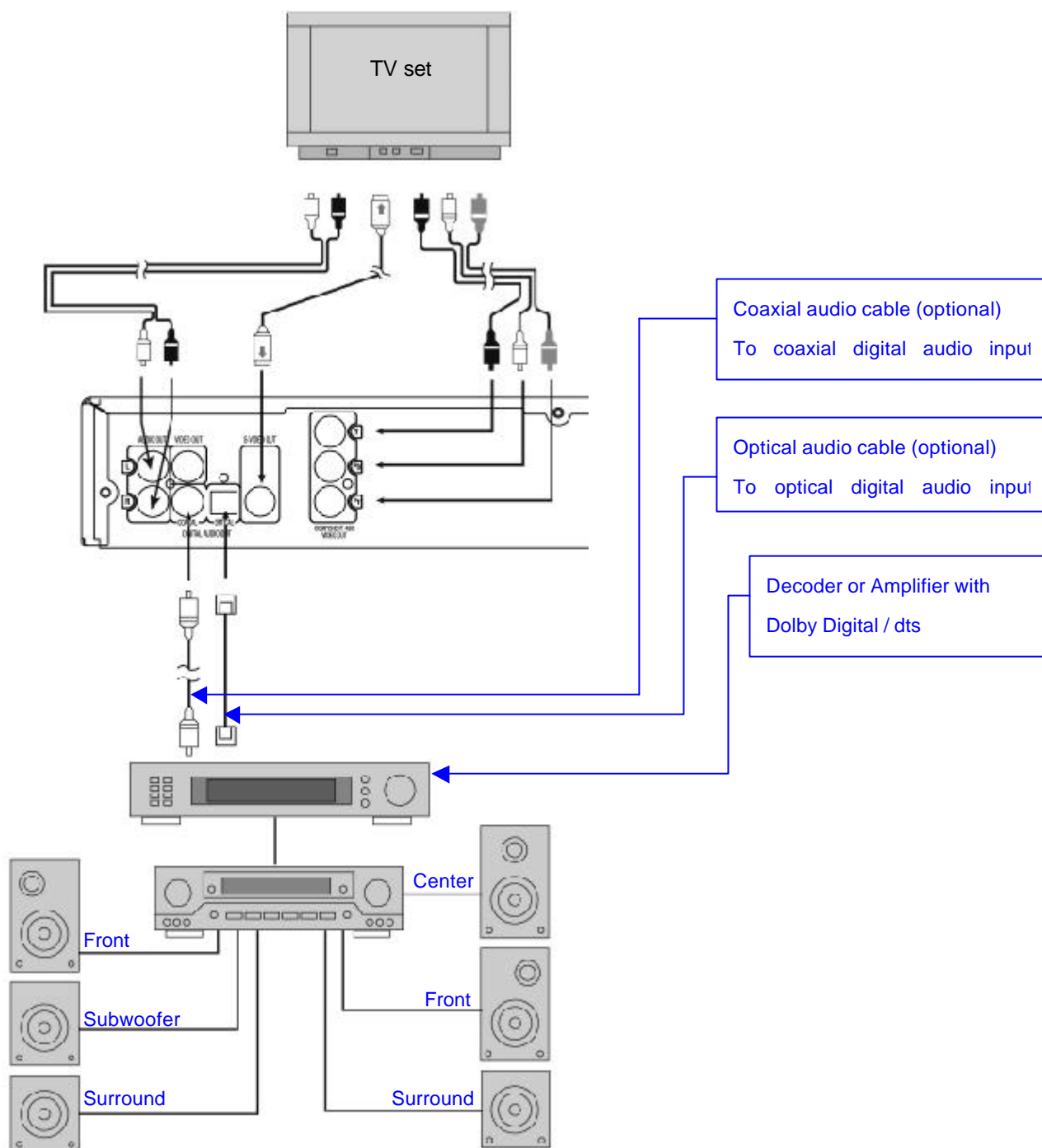


Connecting to a monaural TV set



Operating Instructions

Connecting to a decoder with a Dolby Digital or DTS processing

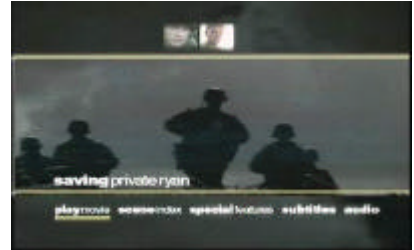


4-2 Selecting Video MODE

Press SETUP button and select VIDEO submenu on SETUP screen. After that, select TV type by pressing DOWN arrow button () until desired TV mode is selected. For more information, refer to 7.2 Video on the Instruction Manual.

4-3 Selecting the desired DVD menu Item

When a DVD disc is loaded, select desired menu item using arrow button or numeric button, if number for each menu item is displayed, then press the SELECT button to start play. To select subtitles, the forth menu item in the figure as shown right, press the RIGHT arrow button three times and press the SELECT button.

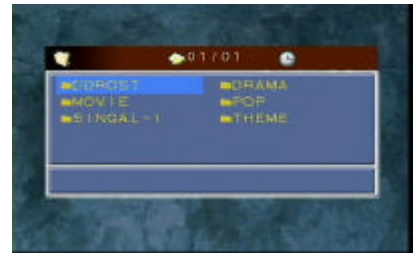


Example:

1. Press the RIGHT arrow button ()
2. Press the RIGHT arrow button ()
3. Press the RIGHT arrow button ()
4. Press the SELECT button

4-4 Selecting the desired MP3 folder

When a MP3 disc is loaded, you may see the menu screen as shown right. To play a MP3 title, you should select a title under the desired folder. Use arrow button, select the folder, which you want to play, by pressing the SELECT button. If you press the SELECT button, you can see the file lists under the folder. To select DDROST folder in this case, press the SELECT button.



Example:

1. Press the SELECT button

4-5 Selecting the desired MP3 title

Use arrow button and select an MP3 title using the SELECT button then play will start automatically. When you know the title number, enter the MP3 title number using numeric buttons and press the SELECT button. If you want to play an adjacent MP3 title, press the NEXT button for next title and the PREV button for previous title during playing. To select "005 HAVEYOU" MP3 title in this case, press the DOWN arrow button twice and press the SELECT button.



Example:

1. Press the DOWN arrow button ()
2. Press the DOWN arrow button ()
3. Press the SELECT button

4-6 Searching

When you want to view the disc contents in fast forward or fast reverse, you can do that by pressing FF/SF button(▶▶) or FR/SR button (◀◀). There are total 6 steps for DVD, 4 steps for VCD and 2 steps for CDDA in fast searching. They are FAST 2X, FAST 4X, FAST 8X, FAST 16X, FAST 32X and FAST 64X for both direction. To search at FAST 16X in forward direction, press the FF/SF button 4 times during play mode.



Example:

1. Press the FF/SF button (▶▶)
2. Press the FF/SF button (▶▶)
3. Press the FF/SF button (▶▶)
4. Press the FF/SF button (▶▶)

4-7 Resume Play

If power is OFF by pressing the POWER button during PLAY or PRESTOP state, play is resumed from the point where it was stopped. If you switch OFF by disconnecting AC cord, the machine will start playing from the first track or chapter.

Example:

Press the POWER button during play mode or prestop mode.

4-8 Slow Viewing

When you want to view the disc contents very slowly in forward or reverse direction, you can do that by pressing the FF/SF button (**▶▶**) or the FR/SR button (**◀◀**) during pause mode. There are total 3 steps for DVD and VCD. They are SLOW 1/2X, SLOW 1/4X and SLOW 1/8X for both direction. The slow reverse function is possible only when a DVD disc is loaded. To view at slow 1/4X in forward direction, press the FF/SF button (**▶▶**) two times during pause mode.



Example:

1. press the PLAY/PAUSE button (**⏮**)
1. Press the FF/SF button (**▶▶**)
2. Press the FF/SF button (**▶▶**)

4-9 Selecting Audio Language

This function works only with discs on which multiple audio sound track languages are recorded. If the loaded disc supports multiple languages, you can see the AUDIO indicator on fluorescent display. In the figure shown right, there are total 8 audio languages. To select the third audio language, press the AUDIO button twice during play.

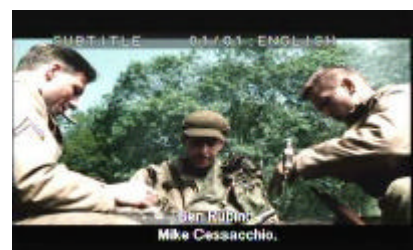


Example:

1. Press the AUDIO button
2. Press the AUDIO button

4-10 Selecting Subtitle Language


This function works only with discs on which multiple subtitle languages are recorded. If the loaded disc supports multiple languages, you can see the SUB-T indicator on fluorescent display. In the figure shown right, there is only one subtitle language. To turn on the subtitle language, press the SUBTITLE button. If you press it again, you can turn off the subtitle language.



Example:

1. Press the SUBTITLE button

4-11 Selecting Angle

Some DVD discs may contain scenes, which have been shot simultaneously from a number of different angles. If the loaded disc supports multiple angles, you can see  indicator on the fluorescent display and the TV screen. In the figure shown right, there are total 9 angles. To switch to the angle number 2, press the ANGLE button.



Example:

1. Press the ANGLE button

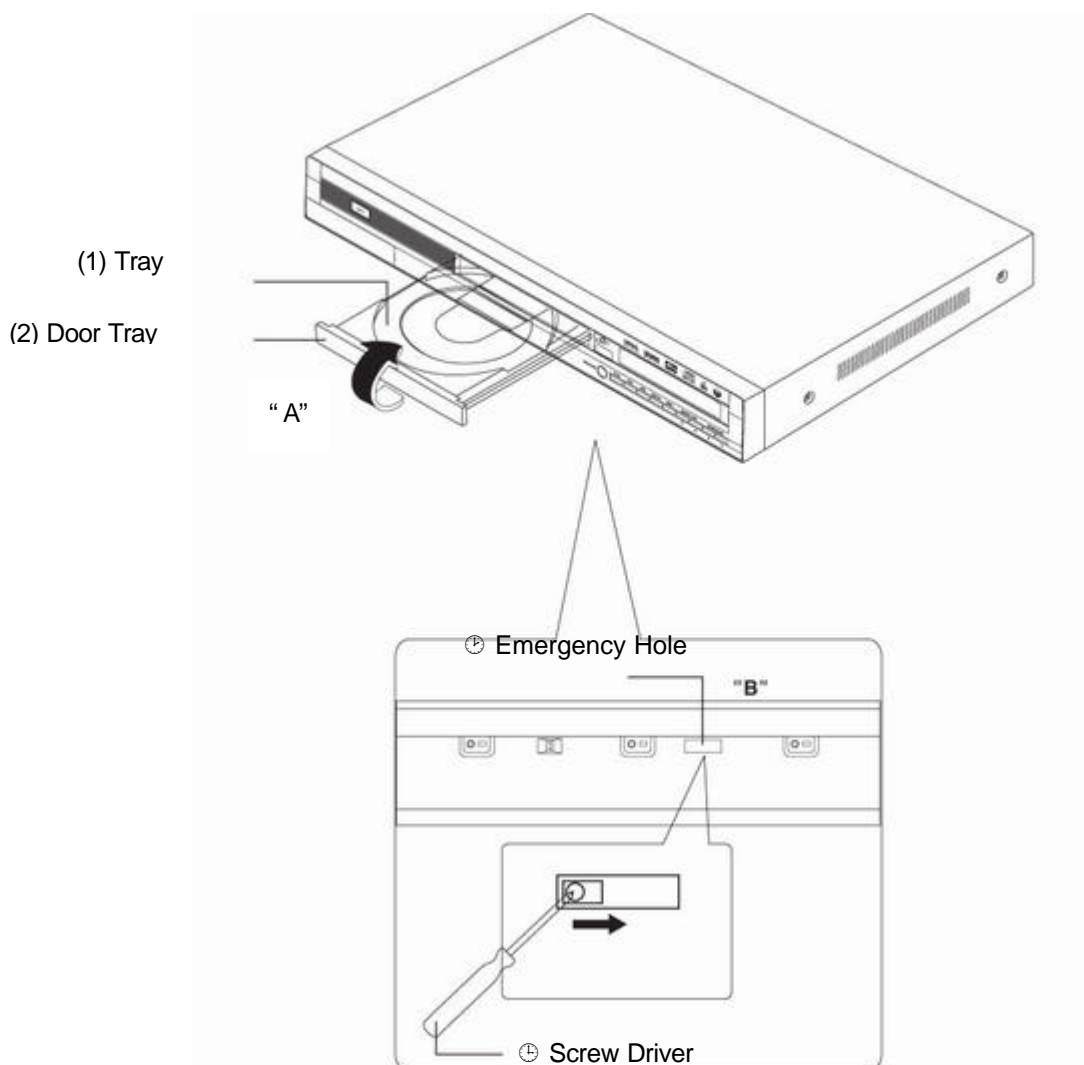
5. Disassembly and Reassembly

5-1 Cabinet and PCB

5-1-1 Door Tray Removal

- 1) Supply Power and open Tray (1).
- 2) Disassemble the Door Tray (2) in direction off arrow "A" .
- 3) Close Tray (1) and power off.

Note : If Tray doesn' t open, insert a sharp point into emergency hole, and then push the tap in the hole in direction of arrow, After then open tray manually



<Bottom View>

Fig 5-1 Door Tray Removal

Disassembly and Reassembly

5-1-2 Top Cabinet Removal

- 1) Remove 4 Screws (1) on the back Top Cabinet.
- 2) Remove 2 Screws (2), (3) on the left and right side.
- 3) Lift up the Top Cabinet in direction of arrow.

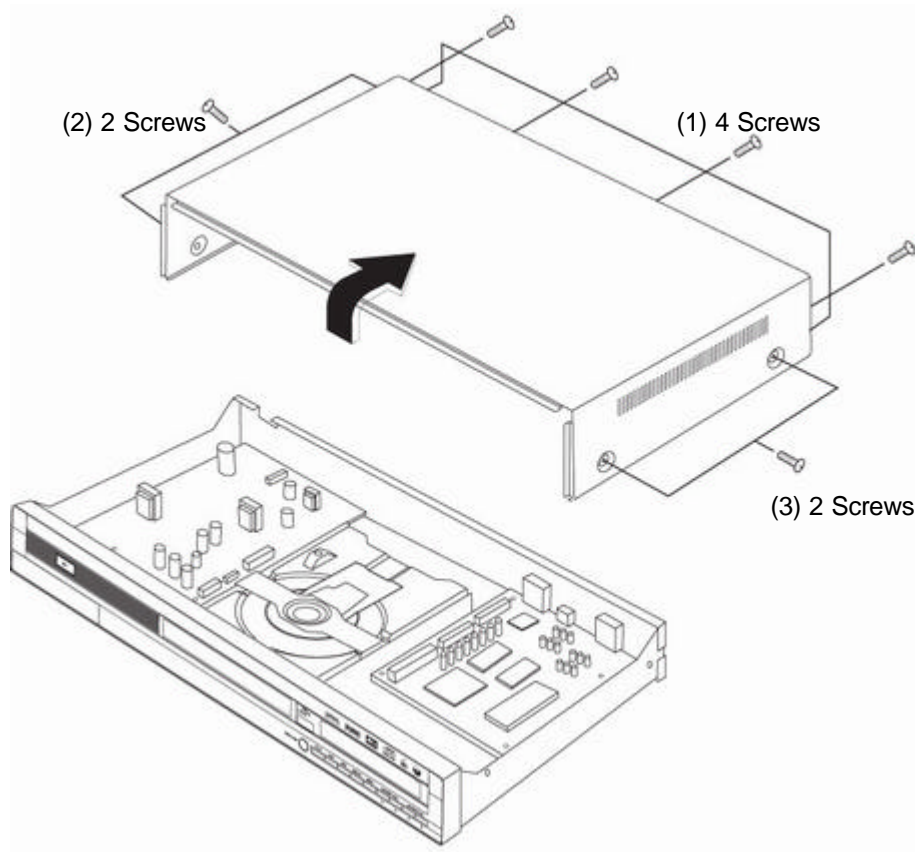


Fig 5-2 Top Cabinet Removal



*You have to lift up in direction of arrow, certainly!

5-1-3 PCB Cable Removal

- 1) Disconnect PCN1 (1).
- 2) Disconnect PCN4 (2).
- 3) Disconnect LCN1 (3).
- 4) Disconnect CON2 (4).
- 5) Disconnect CON1 (5).
- 6) Disconnect CON6 (6).

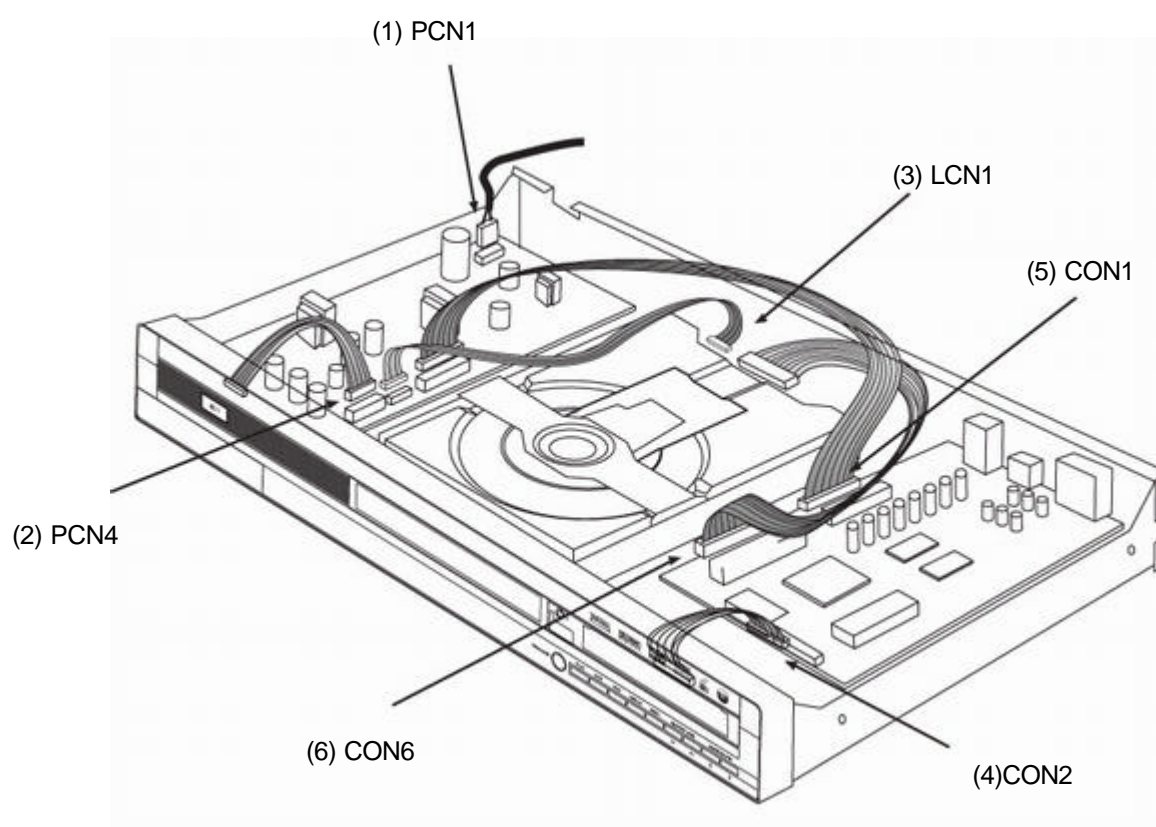


Fig 5-3 PCB Cable Removal

5-1-4 PCB and Front Ass' y Removal

- 1) Remove 2 Screws (1) on the back of the Cabinet.
- 2) Remove 8 Screws (2) and disassemble the Main PCB (3) and SMPS PCB (4).
- 3) Remove 6 Screws (5) and disassemble the Front Ass' y (6).

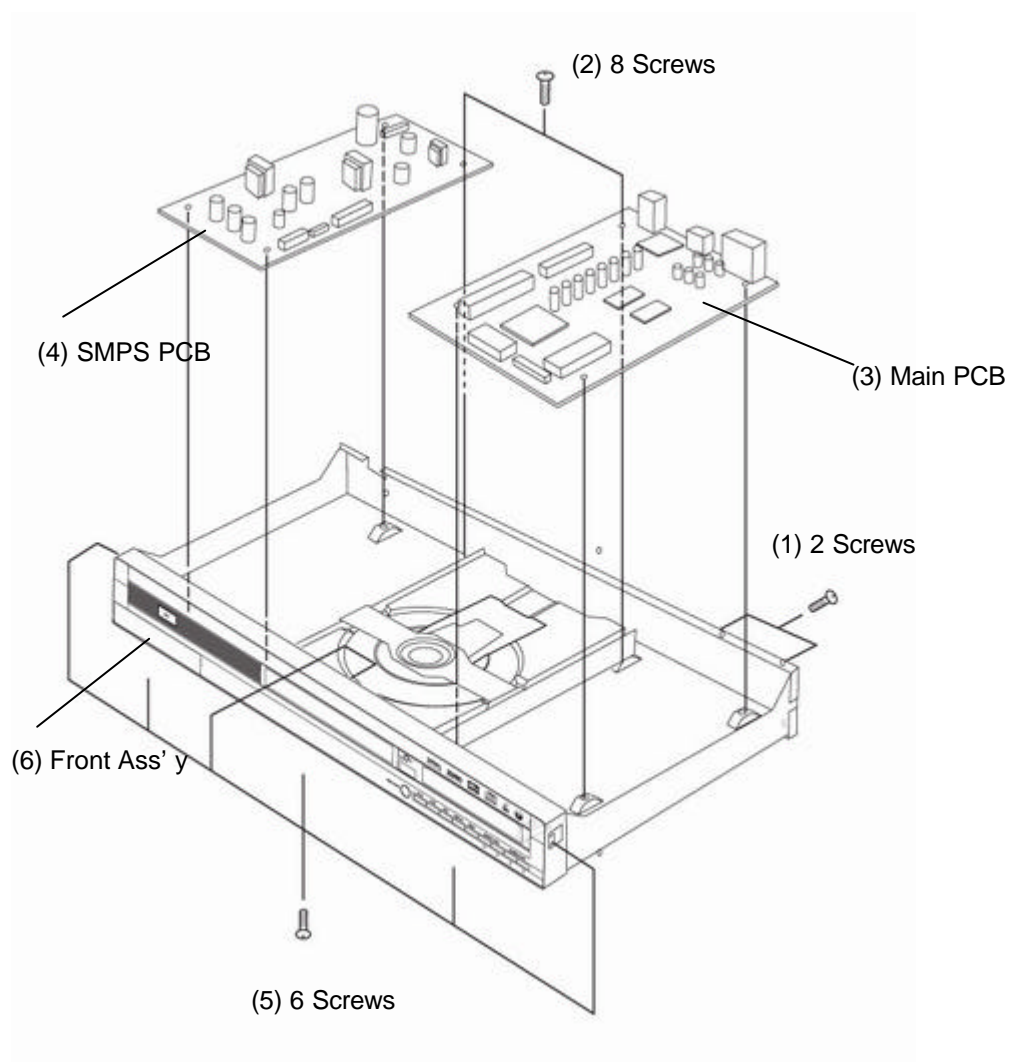


Fig 5-4 PCB and Front Ass' y Removal

5-1-5 Loader Removal

1) Remove 4 Screws (1) and disassemble the Loader (2).

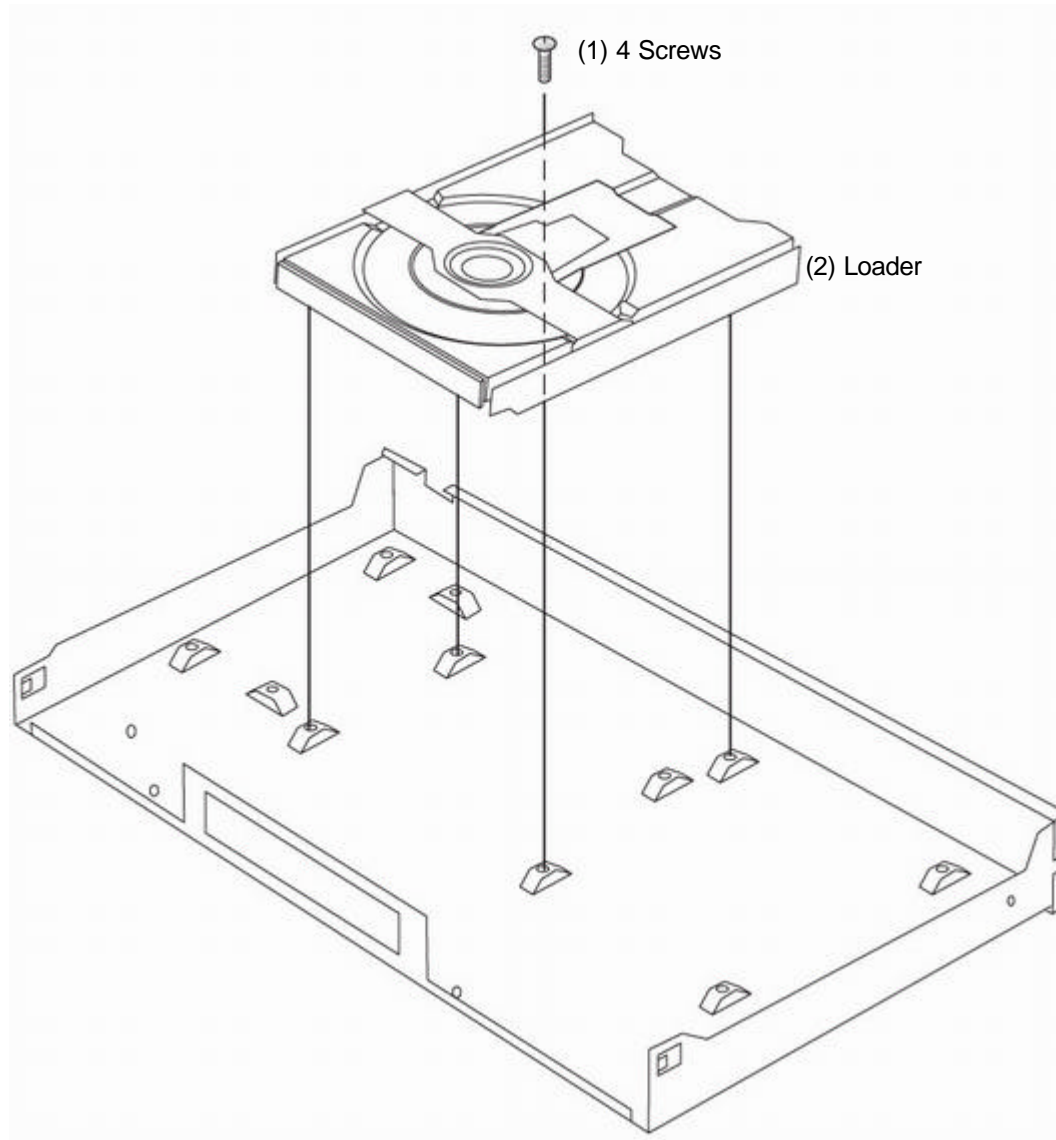


Fig 5-5 Loader Removal

5-1-6 Front PCB Removal

- 1) Remove 9 Screws (1) and disassemble the Front PCB (2) from the Front Ass'y (3).

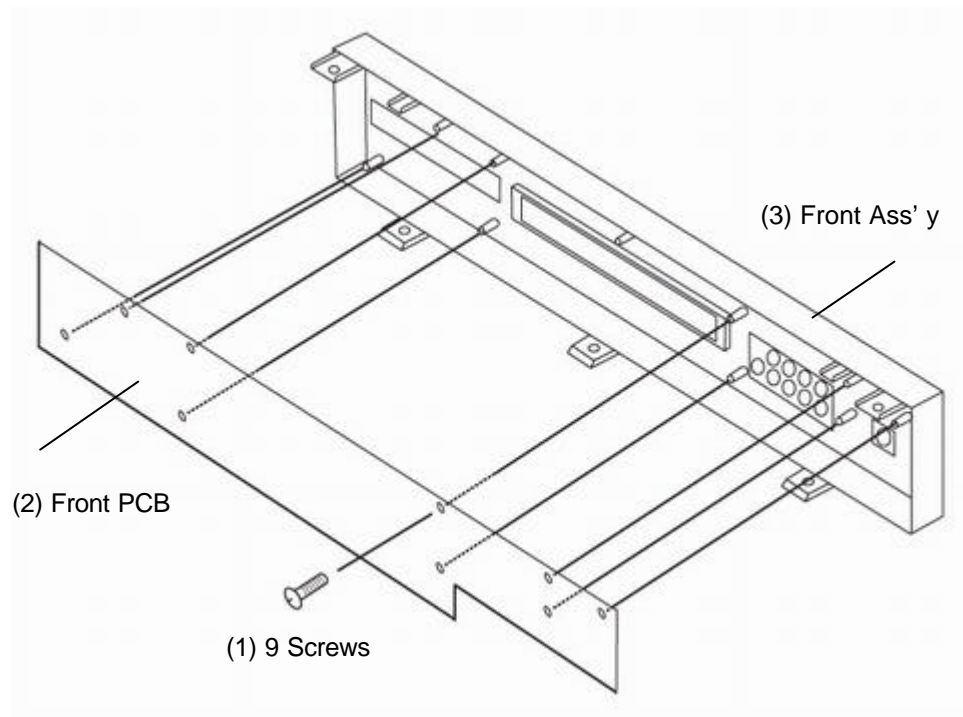


Fig 5-6 Front PCB Removal

6. Troubleshooting

An Appearance	Requires Confirmation
No power	Insert the AC power plug securely into the power outlet.
No picture	Make sure that the equipment is connected properly. Make sure that the input setting for the TV is Video (AV).
No sound	Make sure that the equipment is connected properly.
Distorted sound	Make sure that the input settings for the TV and stereo system are correct.
No fast forward or fast reverse	Some discs may have sections that prohibit fast forward or fast reverse.
No proper aspect ratio	Select the correct setup for TV aspect ratio that matches your TV set.
No operations can be performed with the remote controller	Check the batteries are installed with the correct polarities. Point the remote control unit at the remote control sensor and operate. Remove the obstacles between the remote control unit and remote control sensor.
No button operation	Set the POWER button to OFF and then back to ON. Alternatively, turn off the power, disconnect the power plug and then reconnect it.
Audio soundtrack and/or Subtitle language is not the one you selected.	If the audio soundtrack and/or subtitle language does not exist on the disc, the language selected at the initial settings will not be seen.
No Angle change	This function is dependent on software availability. Even if a disc has a number of angles recorded, these angles may be recorded for specific scenes only.

7. Electrical Part List

7-1.Main board

	DVD-2100 USA Rev.MP01			Location
NO	Spec	Pak'	Usa'	No
	ASS'Y OPTION			
1	AAA, 1.5V, BATTERY		2	
	ASS'Y MAIN			
1	SMPS	Ass'y	1	
2	Hard Disc Cable, mm, 40Pin		1	
3	DVD Loader, Mechanism Ass'y	Ass'y	1	
	PCB ASS'Y, MAIN (T/U)			
1	80C52(80C51), 40PIN DIP, MPU	DIP	1	U601
2	FLASH ROM 512K * 8	DIP	1	U201
	PCB ASS'Y, MAIN (M/I)			
1	POWER CON', 12PIN, 2.54mm	Strat	1	CON1
2	FRONT CON', WAFER,11PIN, 2.54mm	strat	1	CON2
3	BOX HEADER, 20*2, 2.54mm		1	CON6
4	S-VHS CON, MINI DIN, SHILD		1	CON4
5	RCA CON', W-Y,R-B, SHILD	PCB-L	1	CON5
6	RCA CON', SHILD, (G-U-R)	PCB-L	1	CON3
7	Headphone CON' 5PIN, 2.54mm		1	CON7
8	Optical Connector for Audio		1	P1
9	X-TAL, 11.0592MHZ,HC-49/S, 20pF	HC-49/S	1	X601
10	X-TAL, 27MHZ,HC-49/S, 20pF	HC-49/S	1	X201
	PCB ASS'Y, MAIN (DIP)			
1	40PIN, DIP, MPU SOCKET	DIP	1	U601
2	32PIN, DIP, ROM SOCKET	DIP	1	U201
	PCB ASS'Y, MAIN (RAD)			
1	ELEC' CAP', 100uF/16V,M	5mm	5	CE3,CE4,CE5,CE6,CE20
2	ELEC' CAP', 100uF/25V,M	5mm	2	CE1,CE2
3	ELEC' CAP', 10uF/16V,M	5mm	15	CE7,101,102,201,202,303,304,305,306,315,316,317,318,601,602
4	ELEC' CAP', 10uF/25V,M	5mm	2	CE320,CE321
5	ELEC' CAP', 47uF/16V,M	5mm	2	CE301,CE401
6	ELEC' CAP', 22uF/16V,M	5mm	8	CE505,CE506,CE511,CE512,CE513,CE514,CE515,CE516
	PCB ASS'Y, MAIN (SMD)			
1	PCB, 2 LAYER	FR4	1	
2	CPU&RISC SINGLE CHIP	PQFP	1	U101
3	Video Encoder, NTSC/PAL	LQFP	1	U401
4	64M-SDRAM, 3.3V,400mil,512K*16*8	TSOP(II)	1	U102
5	TTL, HEX INVERTER(FAST)	SOIC	1	U208
6	TTL, HEX INVERTER	SOIC	1	U207
7	EEPROM, 2KBIT,SOIC	SOIC	1	U204
8	AUDIO DAC,	SOIC	1	U301
9	DUAL OP-AMP	SOIC	2	U304,U306

Electrical Part List

	DVD-2100 USA ev.MP01			Location
NO	Spec	Pak'	Usa'	No
	PCB ASS'Y, MAIN (SMD)			
10	WOUND INDUCT', 15uH,3225	SMD	4	L404,L407,L408,L409
11	CHIP POWER BEAD	3216	7	L1,L2,L3,L4,L5,L6,L21
12	CHIP FERRITE BEAD	2012	21	L8 ~ L20, L22, L23, L25, L26, L201,L202, L301, L402
13	ZENER DIODE, 3.9V,350mW	SOT-23	0	
14	ZENER DIODE, 8.2V,350mW	SOT-23	2	D301,D302
15	Switching diode	SOT-23	0	
16	Dual Diode, Common cathode	SOT-23	0	
17	RLS4148	SOT-23	1	D601
18	GENERAL TR, NPN	SOT-23	13	Q301,Q302,Q303,Q501,502,503,505,506,507,512,513,514,515
19	Switching TR, NPN	SOT-23	2	Q519,Q701
20	Switching TR, PNP	SOT-23	2	Q520,Q702
21	GENERAL TR, PNP	SOT-23	1	Q304
22	CHIP RES', 1/8W,33 J	3216	1	R7
23	CHIP RES', 1/8W,0 J	1608	5	R131,R235,R272,R274,R406
24	CHIP RES', 1/8W,10 J	1608	13	R101,R102,R103,R104,R105,R106,R107,R108,R109,R110,R111,R112,R231
25	CHIP RES', 1/8W,100K J	1608	14	R530,R531,R536,R540,R542,R546,R548,R552,R559,R563,R565,R569,R571,R575
26	CHIP RES', 1/8W,10K J	1608	4	R8,R601,R616,R620
27	CHIP RES', 1/8W,1K J	1608	10	R241,R242,R350,R351,R353,R354,R586,R587,R590,R591
28	CHIP RES', 1/8W,1M J	1608	3	R234,R261,R277
29	CHIP RES', 1/8W,120 J	1608	2	R551,R539
30	CHIP RES', 1/8W,1.2K J	1608	4	R327,R329,R331,R333
31	CHIP RES', 1/8W,22 J	1608	7	R301,R302,R303,R304,R305,R306,R307
32	CHIP RES', 1/8W,220 J	1608	3	R262,R270,R603
33	CHIP RES', 1/8W,20K J	1608	6	R535,R541,R547,R558,R564,R570
34	CHIP RES', 1/8W,33 J	1608	27	R113,114,115,117,118,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,219,228,229,230,232,401,402
35	CHIP RES', 1/8W,3.3K J	1608	15	R271,R345,R347,R361,R405,R538,R544,R550,R561,R567,R573,R602,R609,R612,R617
36	CHIP RES', 1/8W,3.9K J	1608	0	
37	CHIP RES', 1/8W,4.7K J	1608	6	R2,R3,R120,R121,R122,R202
38	CHIP RES', 1/8W,47 J	1608	8	R220,R221,R222,R223,R224,R225,R226,R227
39	CHIP RES', 1/8W,470 J	1608	0	
40	CHIP RES', 1/8W,47K J	1608	2	R129,R130
41	CHIP RES', 1/8W,330 J	1608	2	R127,R128
42	CHIP RES', 1/8W,560 J	1608	1	R404
43	CHIP RES', 1/8W,5.6K J	1608	8	R322,R323,R324,R325,R326,R328,R330,R332
44	CHIP RES', 1/8W,620 J	1608	8	R408,R409,R414,R415,R416,R417,R418,R419
45	CHIP RES', 1/8W,6.2K J	1608	2	R348,R346
46	CHIP RES', 1/8W,75 J	1608	7	R545,R562,R574,R584,R585,R588,R589
47	CHIP RES', 1/8W,68 J	1608	1	R568
48	CHIP RES', 1/8W,91 J	1608	1	R124
49	CHIP CAP', 25V,3pF,J,COG	1608	4	C412,C421,C424,C427
50	CHIP CAP', 25V,15pF,J,COG	1608	0	

Electrical Part List

	DVD-2100 USA Rev.MP01			Location
NO	Spec	Pak'	Usa'	No
	PCB ASS'Y, MAIN (SMD)			
51	CHIP CAP', 25V,22pF,J,COG	1608	1	C228
52	CHIP CAP', 25V,2700pF,J,COG	1608	4	C302,C303,C304,C305
53	CHIP CAP', 25V,27pF,J,COG	1608	13	C124,C125,C129,C413,C414,C422,C423,C425,C426,C428,C429,C602,603
54	CHIP CAP', 25V,33pF,J,COG	1608	2	C227,C229
55	CHIP CAP', 25V,330pF,J,COG	1608	0	
56	CHIP CAP', 25V,47pF,J,COG	1608	7	C219,C531,C532,C533,C535,C536,C537
57	CHIP CAP', 25V,470pF,J,COG	1608	2	C540,C541
58	CHIP CAP', 25V,560pF,J,COG	1608	4	C306,C307,C308,C309
59	CHIP CAP', 25V,0.1uF,Z,Y5V	1608	68	C1,C2,C3,C4,C5,C6,C7,C20,C101,C102,C103,C104,C105,C106,C107,C108,C109,C110,C111,C112,C113,C114,C115,C116,C117,C118,C120,C121,C123,C128,C201,C202,C203,C204,C205,C206,C207,C208,C209,C210,C211,C212,C213,C214,C215,C218,C220,C232,C233,BC301,BC303,BC304,BC305,BC314,BC315,BC318,BC319,BC320,BC321,C401,C402,C405,C406,C407,C408,C409,C410,C601
	Total			

Electrical Part List

7-2 FRONT BOARD PART LIST

Front Board SB Type			Location
Spec	Pak'	Usa'	No
ASS'Y FRONT			
PCB ASS'Y, FRONT (T/U)			
PCB ASS'Y, FRONT (M/I)			
(IR)INFRA RECIEVER	L Type	1	U2
TR	T0-92	1	Q1
VFD DISPLAY		1	U3
FRONT POWER WIRE, 5PIN-5PIN(PCB), PCB IN	WIRE	1	CON2
FRONT SIGNAL WIRE, 11PIN-11PIN(PCB), PCB IN	WIRE	1	CON1
TACT S/W, 4PIN,5mm	5mm	11	SW1, SW2, SW3, SW4, SW5, SW6, SW8, SW9, SW10, SW11, SW12
PCB ASS'Y, FRONT (RAD)			
LED,RED, 3 PIE, 5mm Forming, High 4.5mm		1	D2
ELEC' CAP', 10uF/16V,M	5mm	3	CE1,CE2,CE4
ELEC' CAP', 10uF/50V,M	5mm	1	CE3
PCB ASS'Y, FRONT (AXI)			
PCB, 1 LAYER	FR1	1	
JUMPER	8mm	14	JP1,JP2,JP3,JP6 ~ JP9, JP18 ~ JP24
JUMPER	12mm	10	JP4,JP5,JP10 ~ JP17
DIODE	AXIAL	3	D3,D4,D5
Axial Cap, 50V,0.1UF,Z	AXIAL	7	C1,C3,C4,C5,C6,C7,C8
AXIAL,BEAD, 3560	AXIAL	2	L1,L2
AXI' RES', 1/6W,3.3K J	AXIAL	2	R1,R9
AXI' RES', 1/6W,56K J	AXIAL	1	R12
AXI' RES', 1/6W,10K J	AXIAL	6	R3,R4,R5,R6,R7,R8
AXI' RES', 1/6W,330 J	AXIAL		
AXI' RES', 1/6W,22 J	AXIAL	1	NR1
PCB ASS'Y, FRONT BOTTUM (SMD)			
VFD DRIVER	PQFP	1	U1
Total			

Electrical Part List

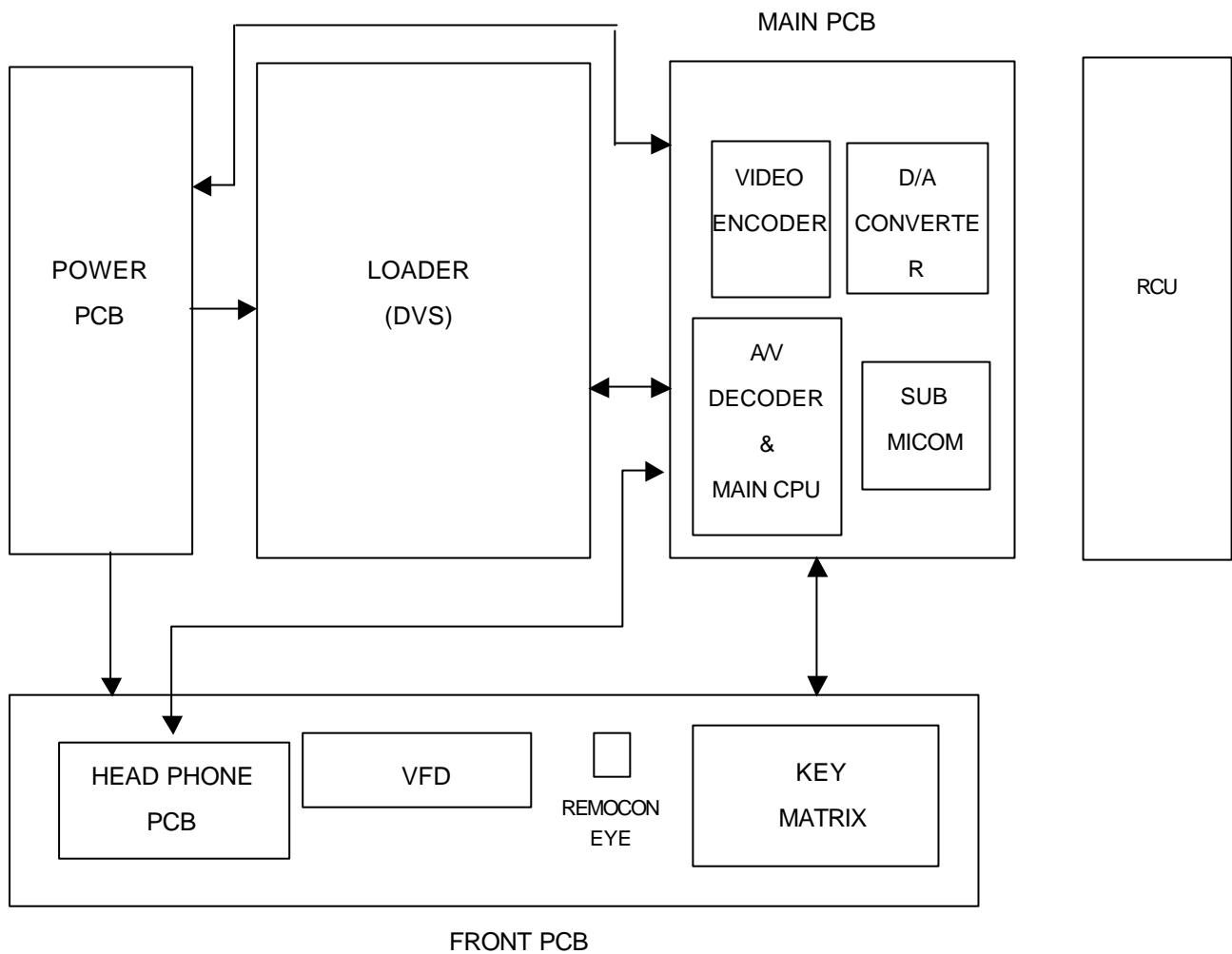
7-3 SMPS PART LIST

	SMPS		Locat ion
NO	Spec	Usa '	No
1	RESISTOR CAR	1	R2
2	RESISTOR CAR	1	R3
3	RESISTOR CAR	2	R5, R7
4	RESISTOR CAR	1	R4
5	RESISTOR CAR	1	R8
6	RESISTOR CAR	1	R12
7	RESISTOR CAR	5	R9, 13, 20, 22, 30
8	RESISTOR CAR	1	R18
9	RESISTOR CAR	1	R10
10	RESISTOR CAR	1	R11
11	RESISTOR CAR	1	R17
12	RESISTOR CAR	1	R19
13	RESISTOR CAR	2	R23, R24
14	CAPACITOR ELE	1	C1
15	CAPACITOR ELE	1	C13
16	CAPACITOR ELE	2	C7, C8
17	CAPACITOR ELE	2	C9, C10
18	CAPACITOR ELE	3	C14, C15, C17
19	CAPACITOR ELE	4	C16, 19, 20, 25
20	CAPACITOR CER	2	C5, C106
21	CAPACITOR MF	2	C101, C102
22	CAPACITOR CER	1	C11
23	CAPACITOR CER	1	C4
24	CAPACITOR CER	1	C103
25	DIODE	1	D1
26	DIODE	1	D4
27	DIODE	2	D3, D5
28	DIODE	3	D8, D9, D10
29	DIODE	1	ZD2
30	DIODE	4	D401-4
31	DIODE	2	D11, D71
32	IC	1	U1
33	IC	1	U2
34	IC	1	U3
35	IC	1	U4
36	FET	1	Q1
37	TR	2	Q2, Q3
38	TR	1	Q501
39	TR	1	Q42
40	FET	1	Q5

Electrical Part List

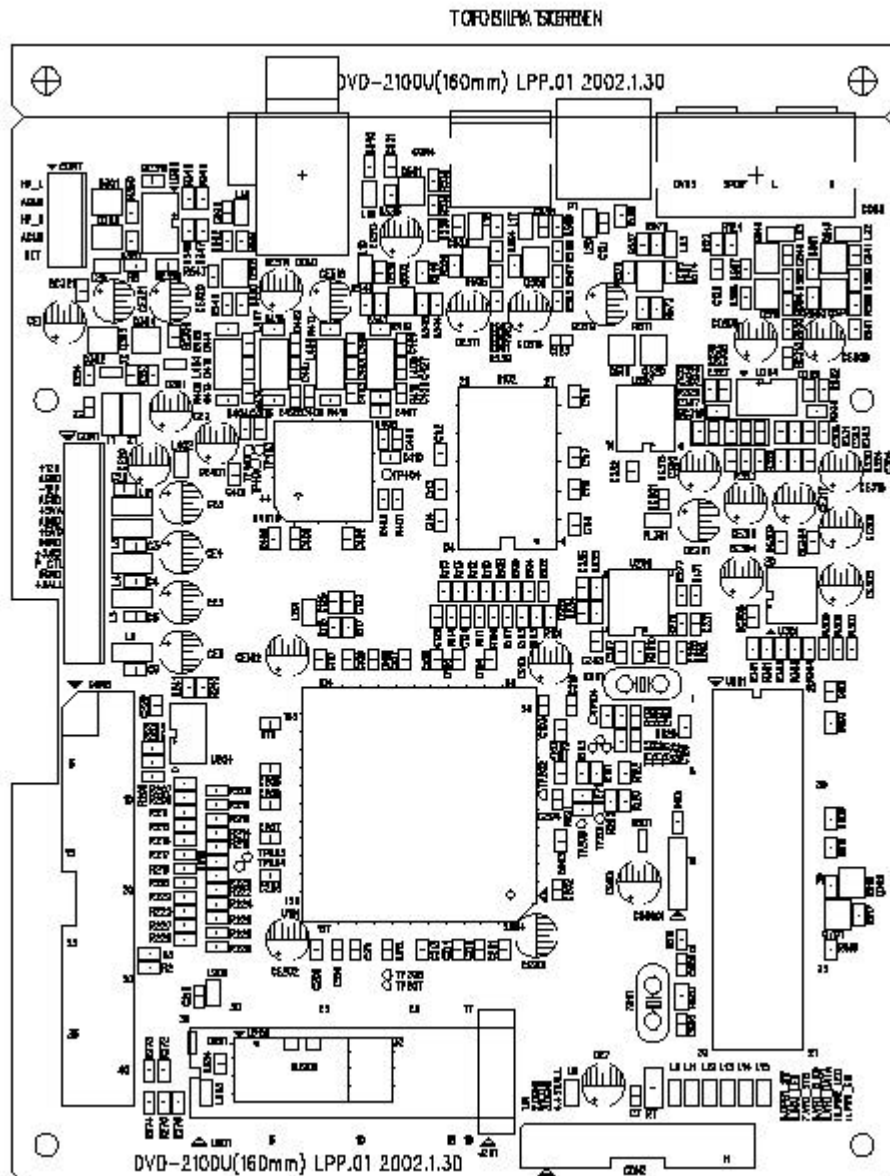
	SMPS		Location
NO	Spec	Usa'	No
41	TRANS	1	T1
42	FUSE	1	F1
43	FUSE HOLDER	1	
44	CHOKE	1	L4
45	CHOKE	2	L2, L3
46	AXIAL CHOKE	2	L6, L7
47	VARISTOR	1	V1
48	THERMISTOR	1	TH1
49	LINE FILTER	1	LF1
50	HARNESS(12PIN)	1	CN1
51	HARNESS(4PIN)	1	CN2
52	WAFER	1	CN3
53	WAFER	1	P1
54	HEAT SINK	2	
55	PCB	1	
56	TRANS CUSHION	1	
57	BOX (OUT BOX)	1/40	
58	JUMPER	5	S2, 3, 4, 9, 10
59	JUMPER	2	S5, 6
60	SCREW	2	
	Total		

8. Block Diagram

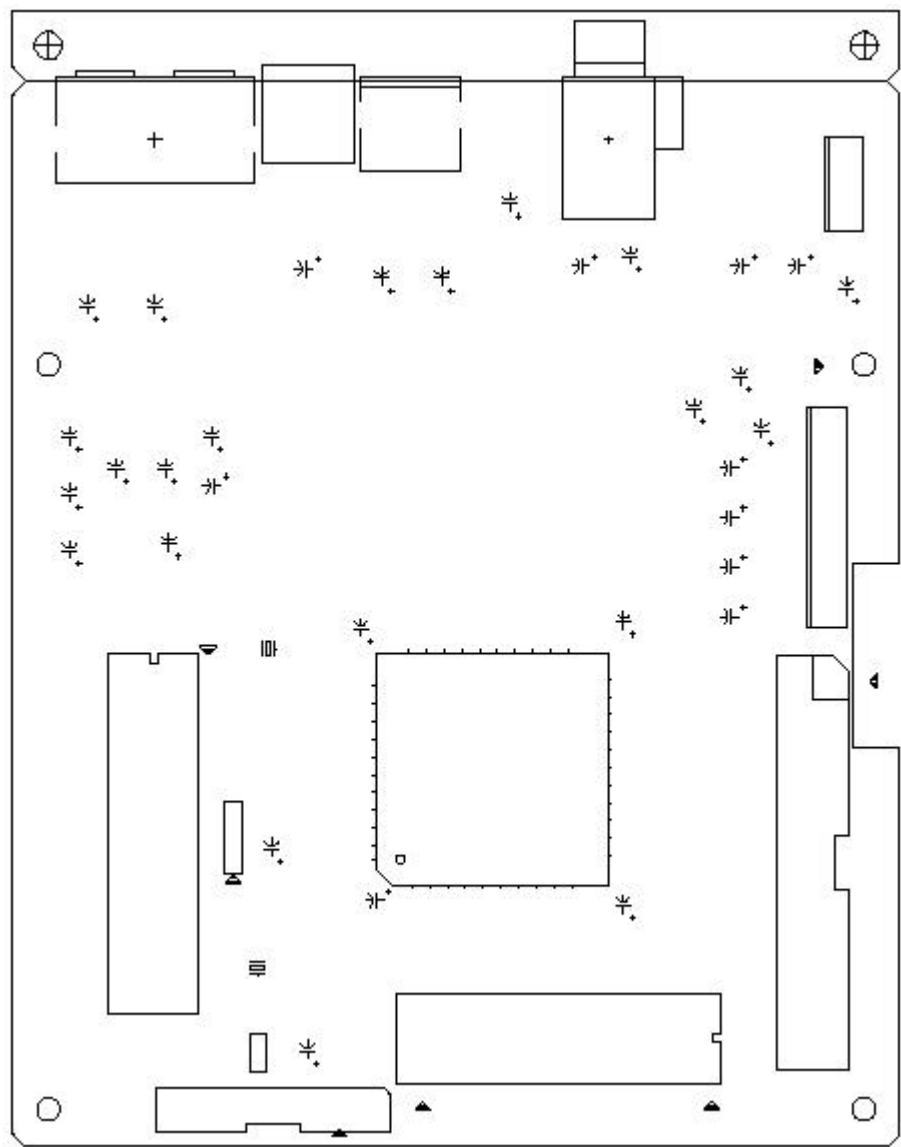


9. PCB Diagrams

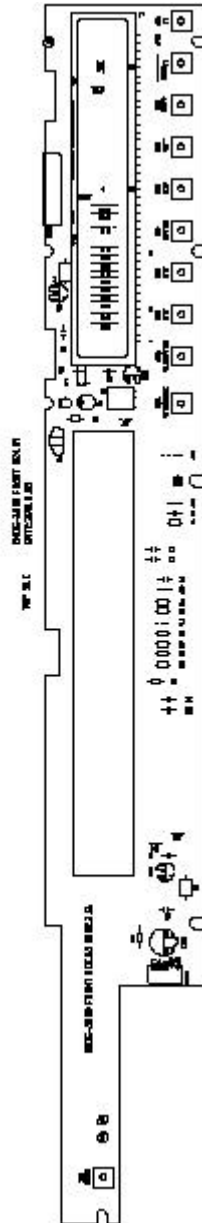
9 - 1 Main PCB (Top)



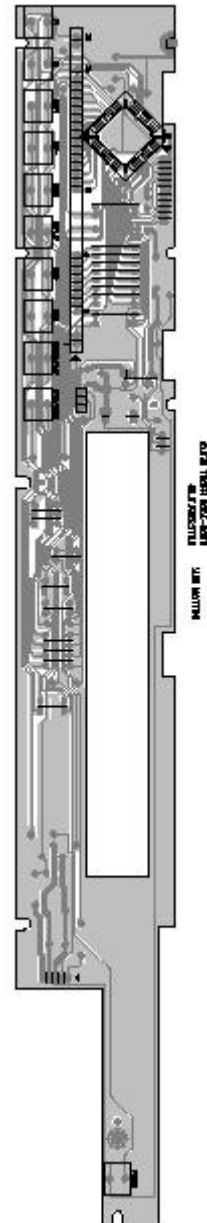
9 - 2 Main PCB (Bottom)



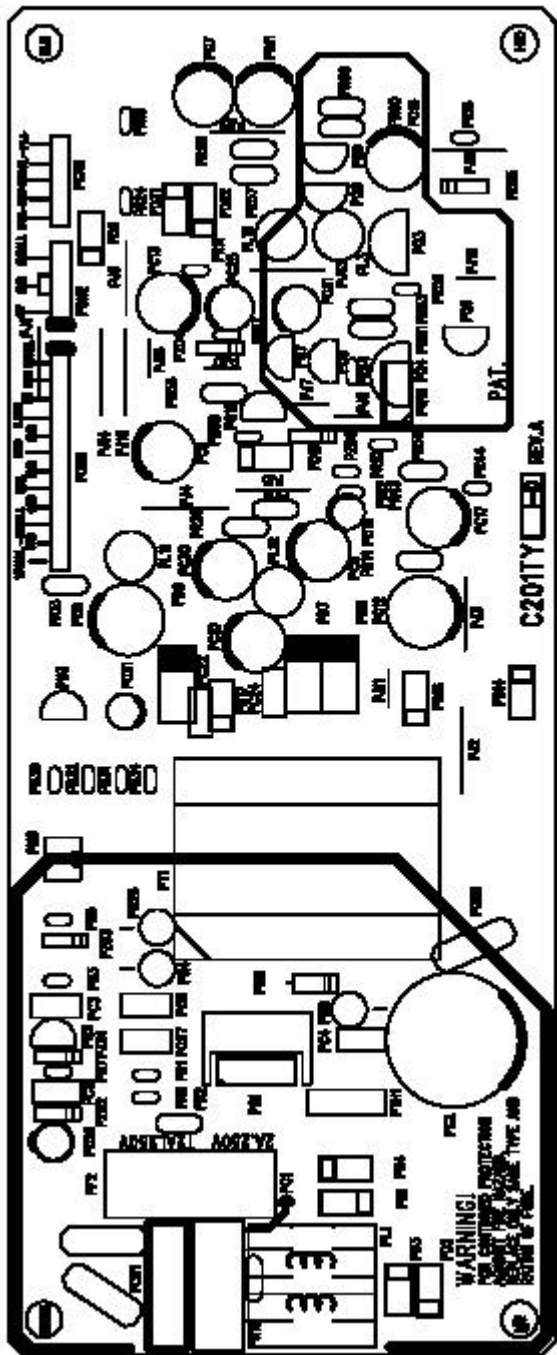
9 - 3 Front PCB (Top)



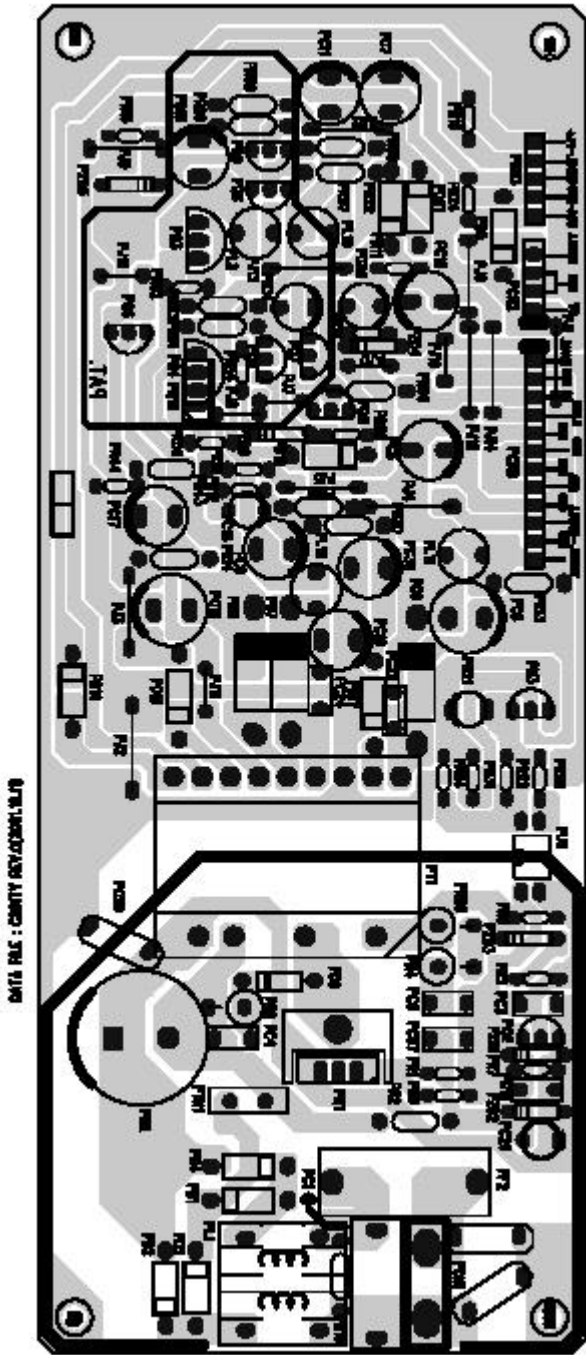
9 - 4 Front PCB (Bottom)



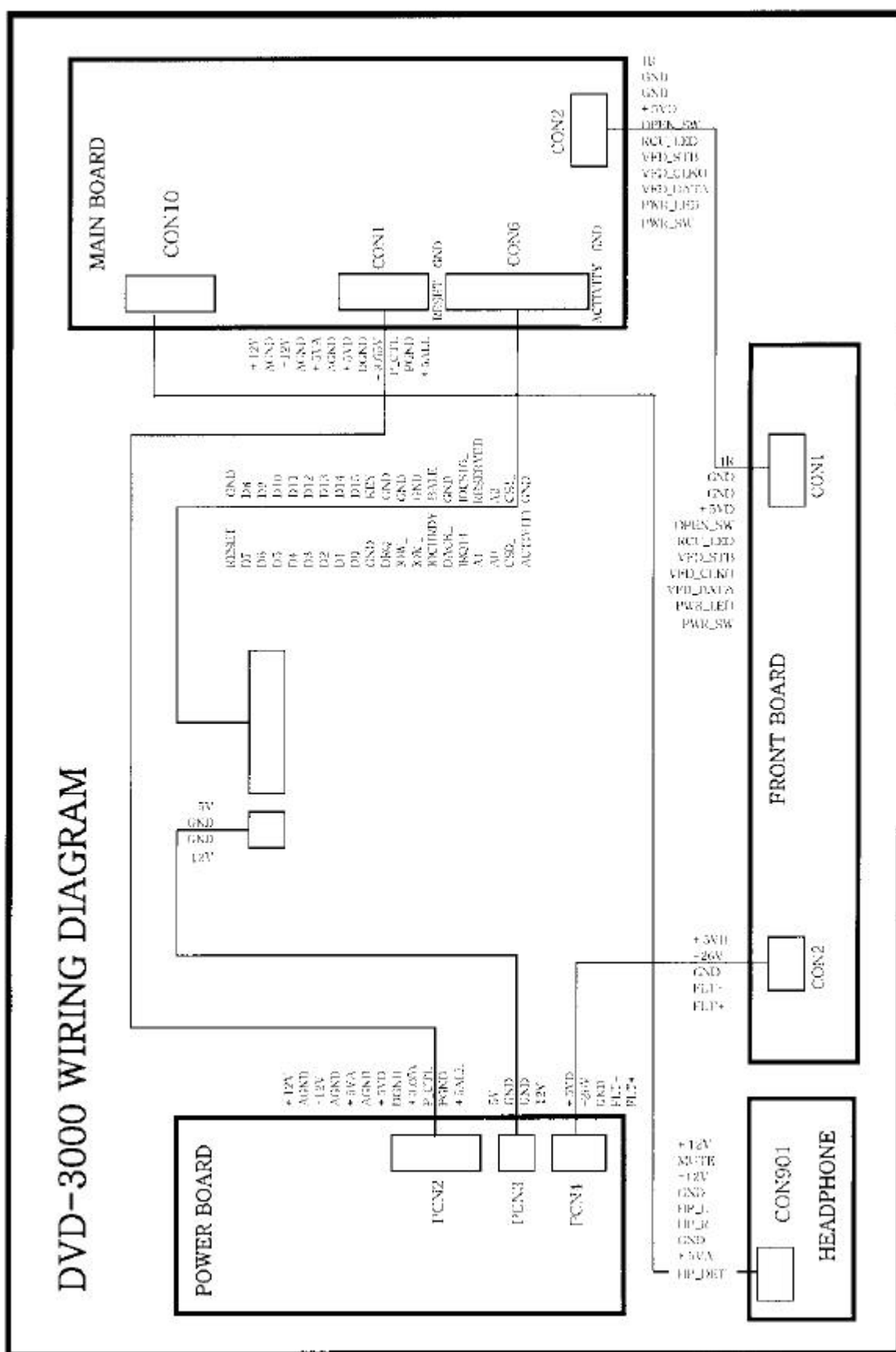
9 - 5 SMPS PCB (Top)



9- 6 SMPS PCB (Bottom)



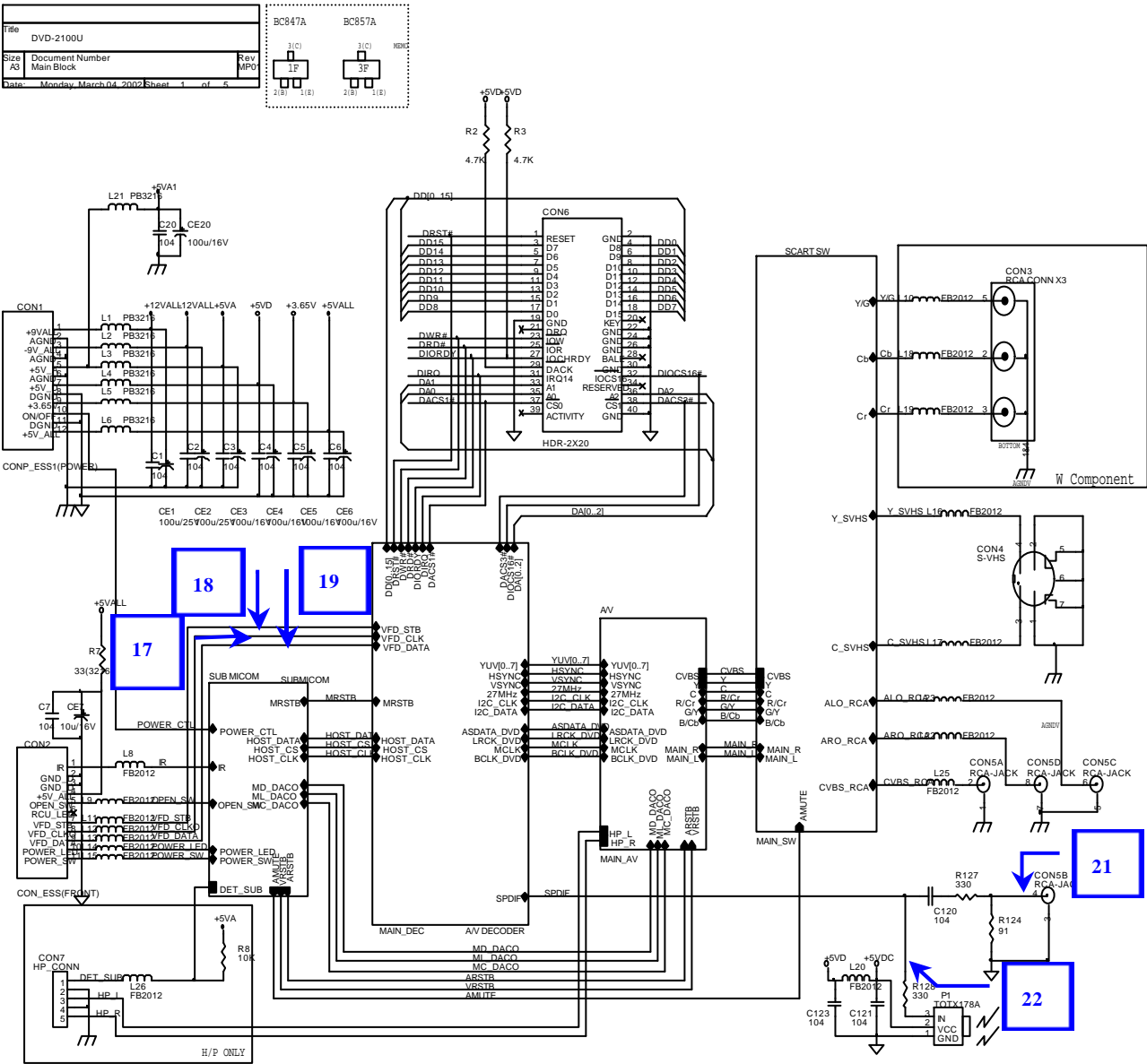
10. Wiring Diagram



11. Schematic Diagrams

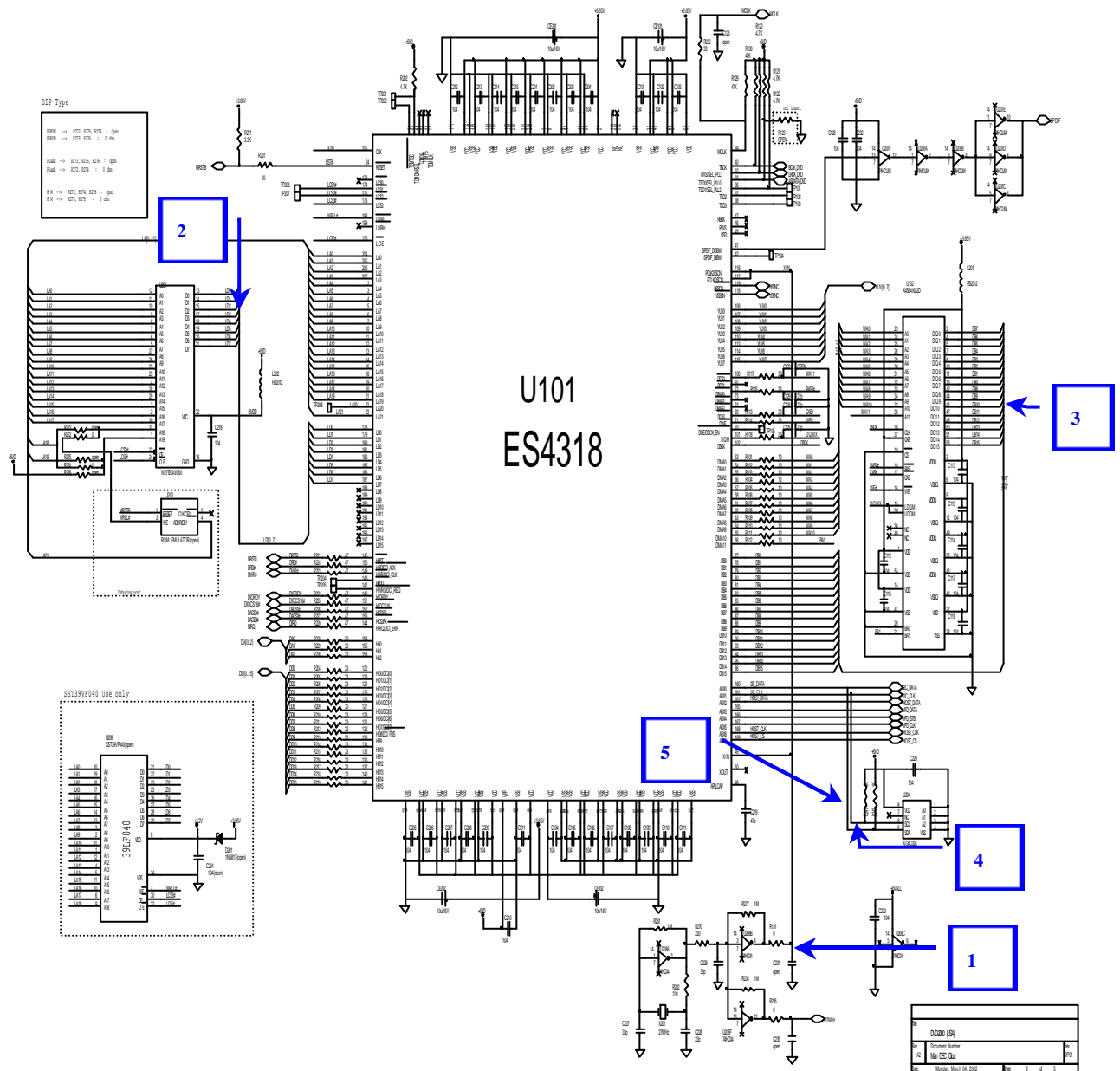
11-1 Main PCB Schematic Diagram

11-1-1 Main PCB Top Schematic diagram





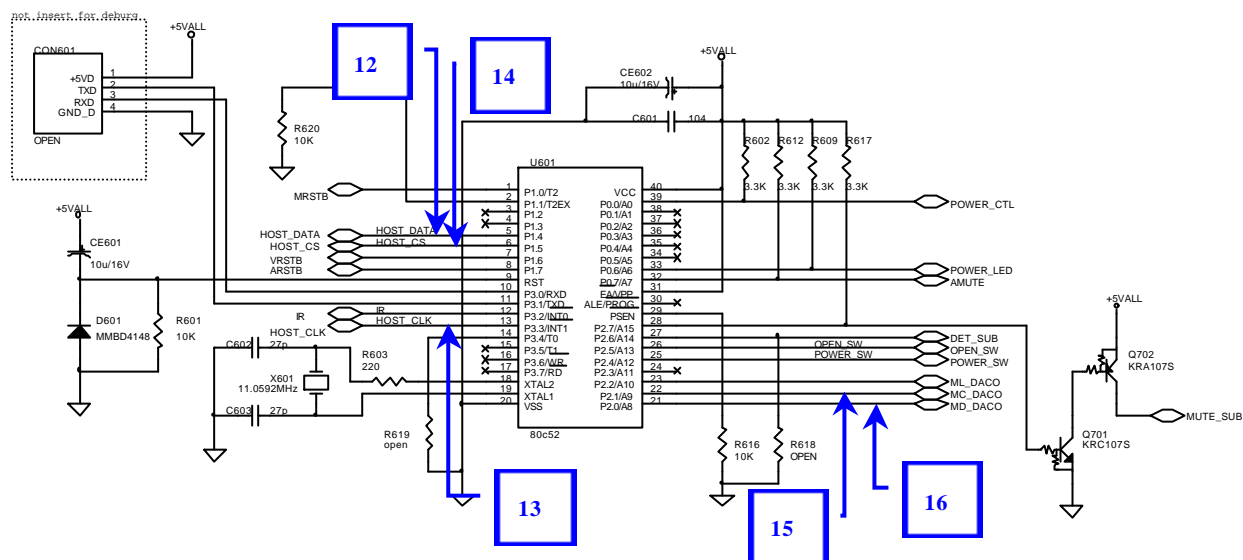
11-1-3 Main PCB MPEG Decoder Block Schematic diagram





Schematic Diagrams

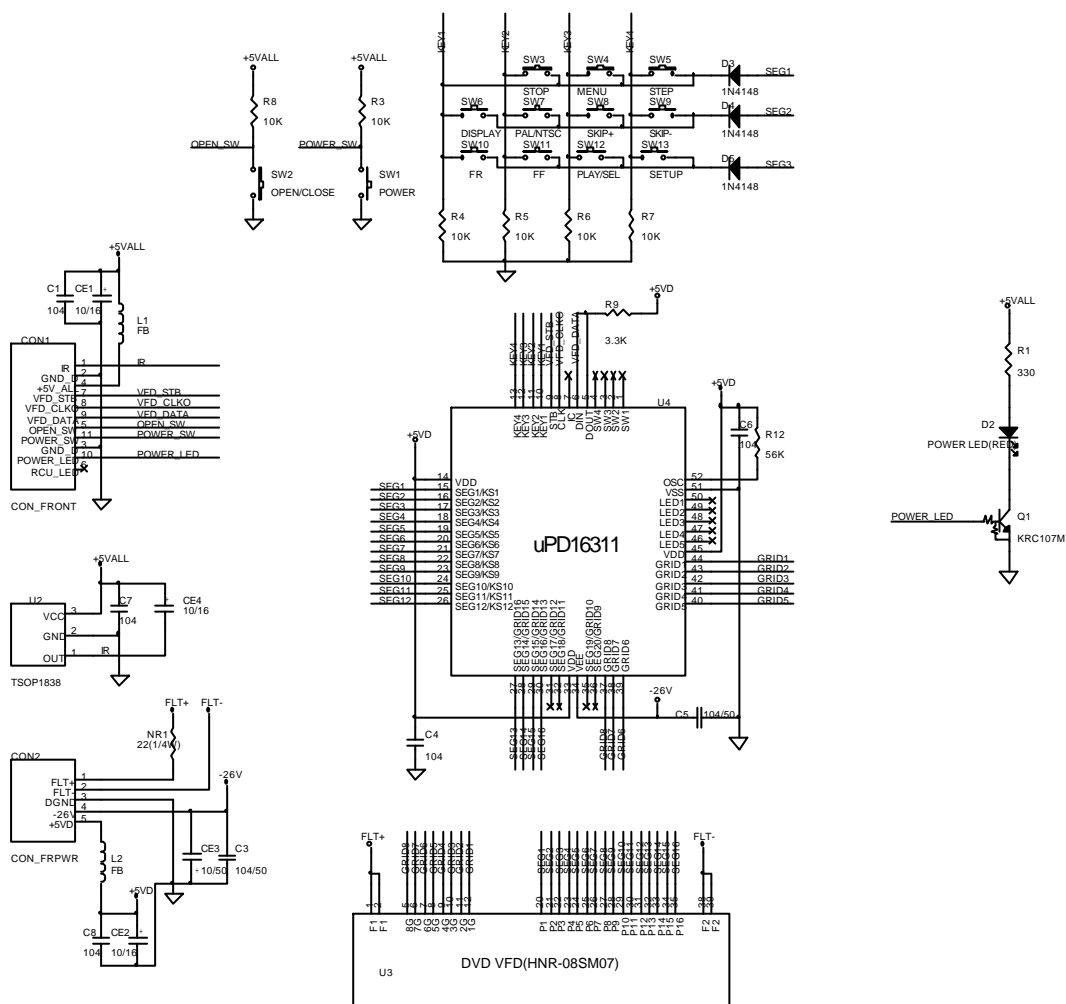
11-1-5 Main PCB Submicom Block Schematic diagram



Title		
DVD-2100U		
Size	Document Number	Rev
A4	Submicom Circuit	MP01
Date	Monday, March 04, 2002	Sheet 5 of 5

11-2 Front PCB Schematic Diagram

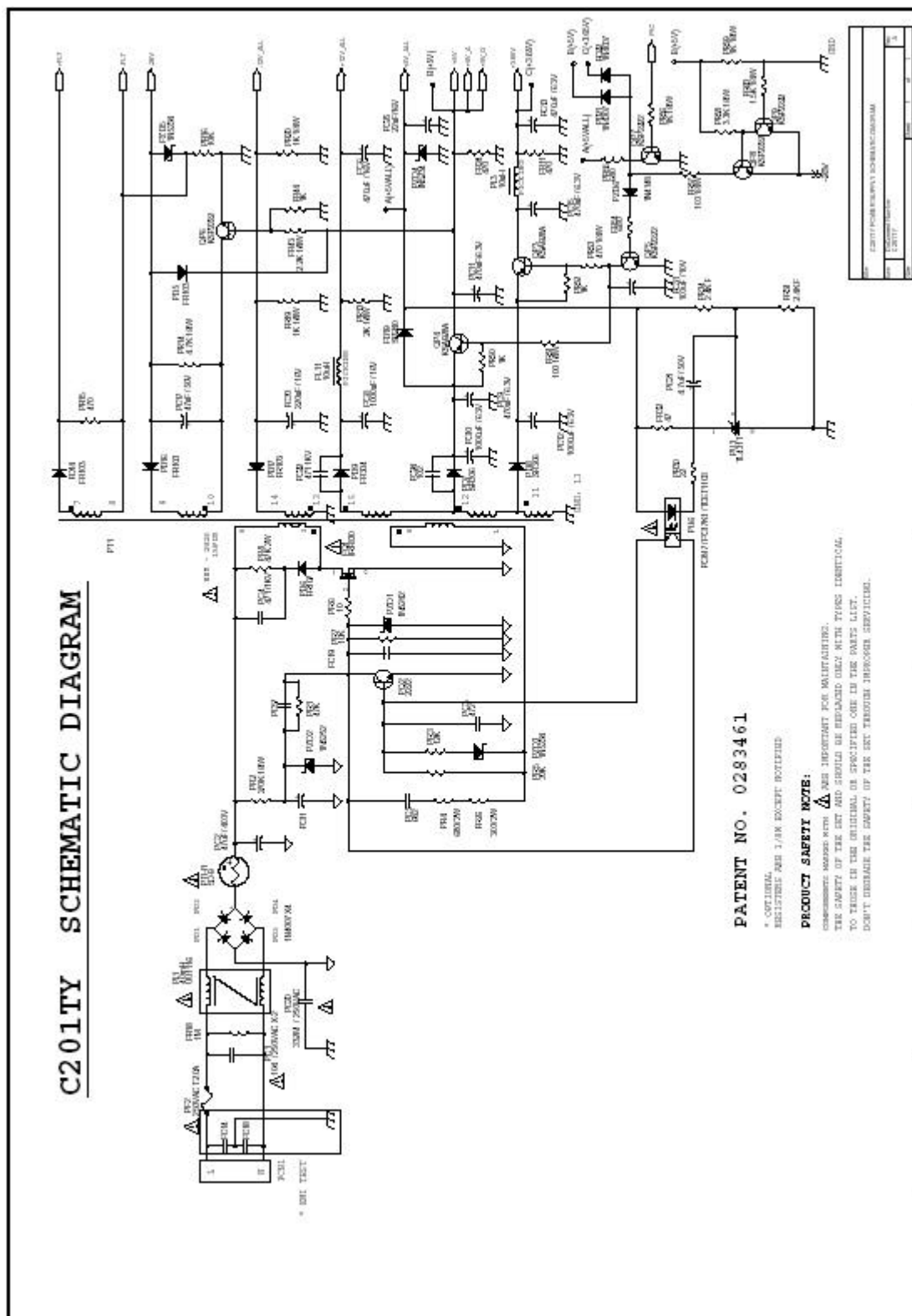
11-2 Front PCB Schematic diagram



Title			DVD-2000(new VFD)
Size A3	Document Number	Front Board Circuit	Rev MP
Date:	Wednesday, September 19, 2001 6:06 PM		

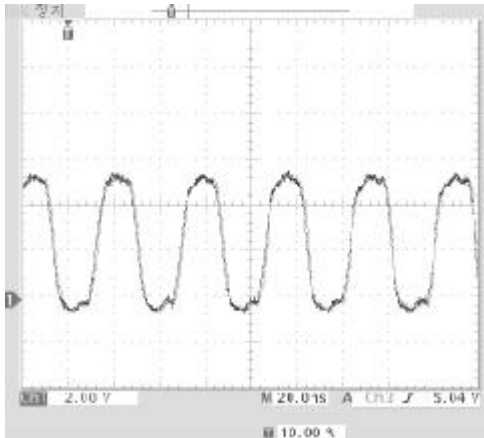
11-3 SMPS PCB Schematic Diagram

11-3 SMPS PCB Schematic diagram

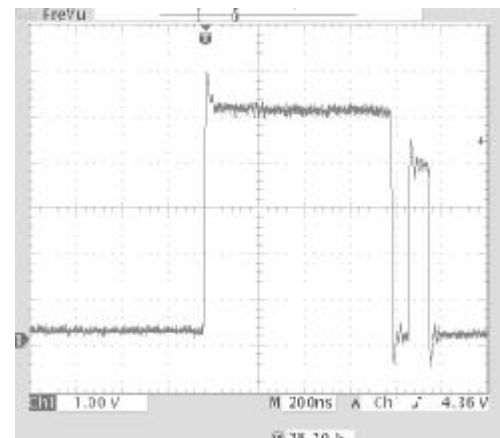


12. Oscillograms

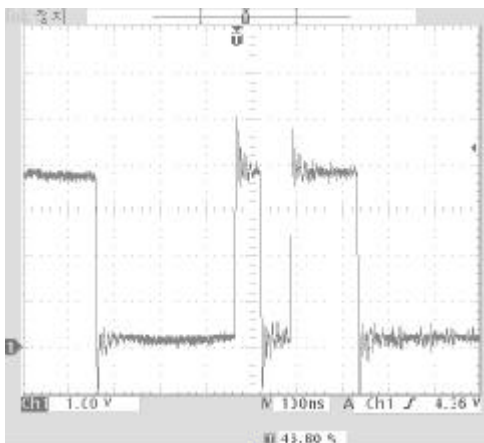
1. 27MHz



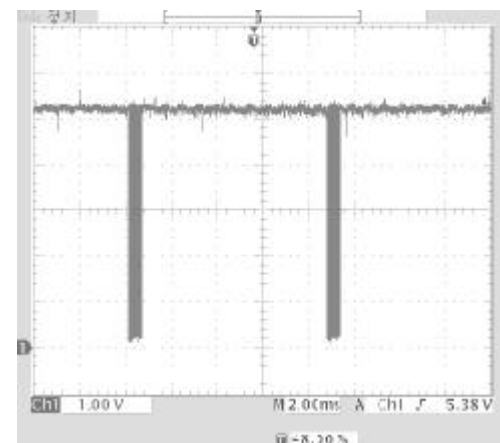
2. ROM- DATA-BUS



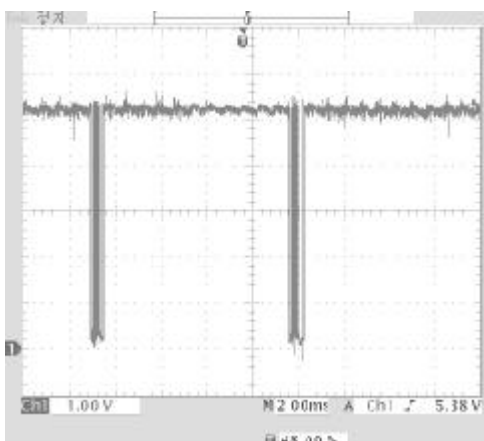
3. RAM-DATA-BUS



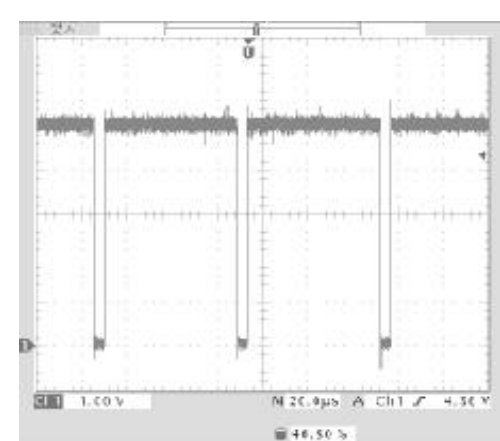
4. 12C-CLK



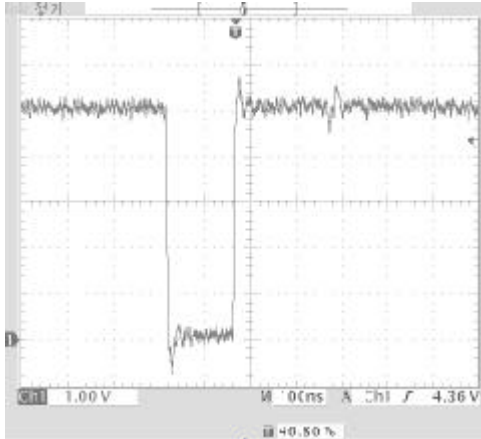
5. 12C-DATA



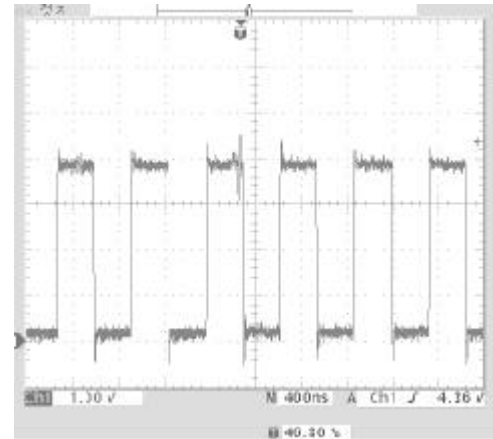
6. HSYNC



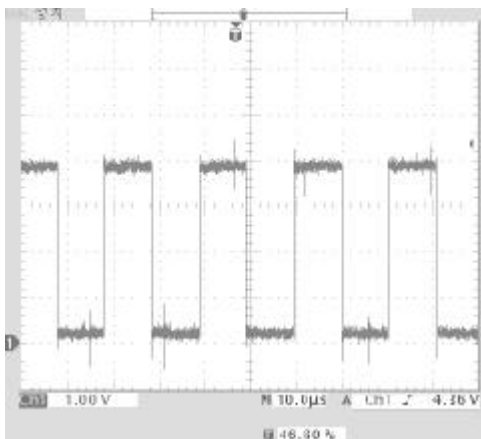
7. VSYNC



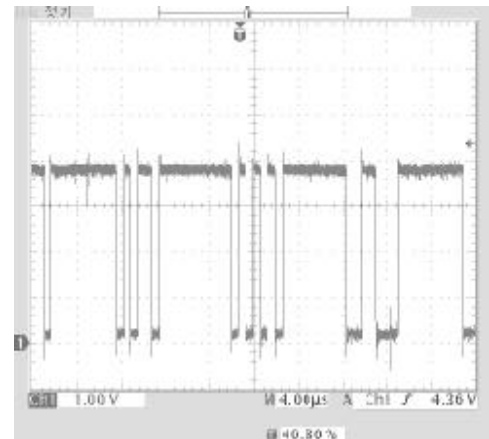
8. BCLK-DVD



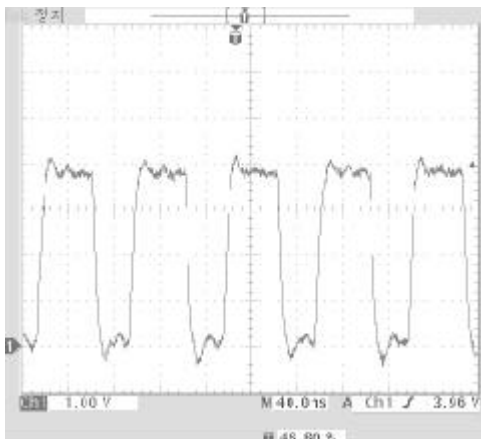
9. LRCK-DVD



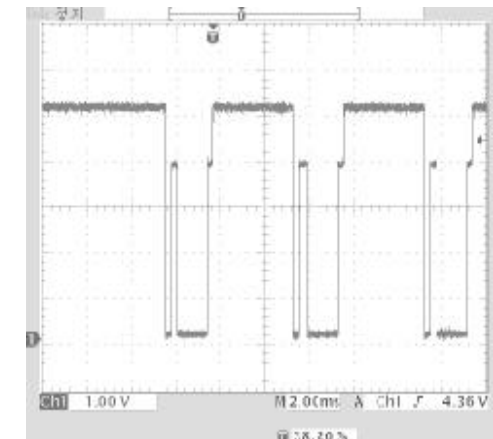
10. TSDO



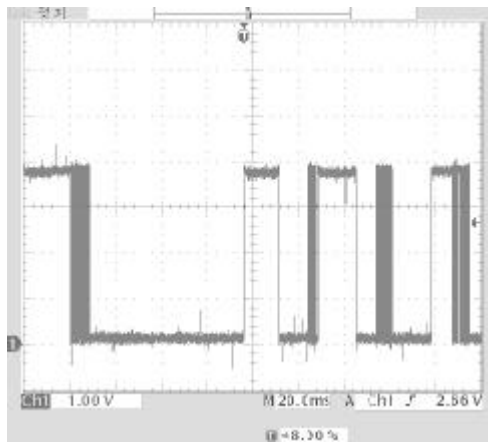
11. MCLK



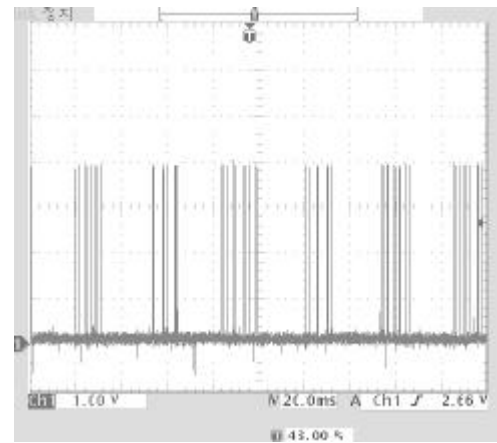
12. HOST-DATA



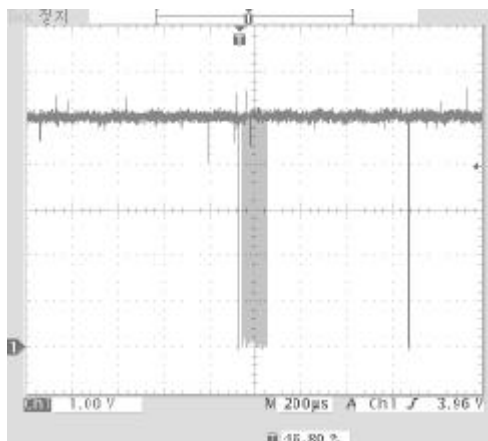
13. HOST-CLK



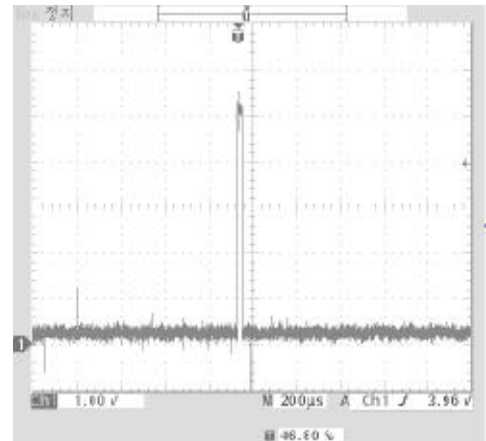
14. HOST-CS



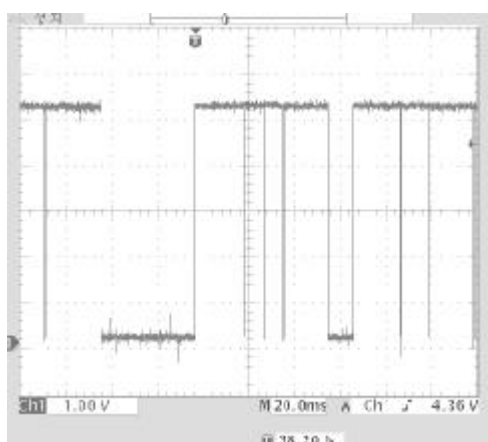
15. MC-DACO



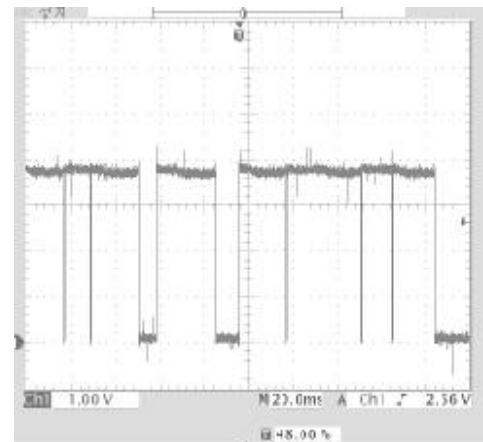
16. MD-DACO



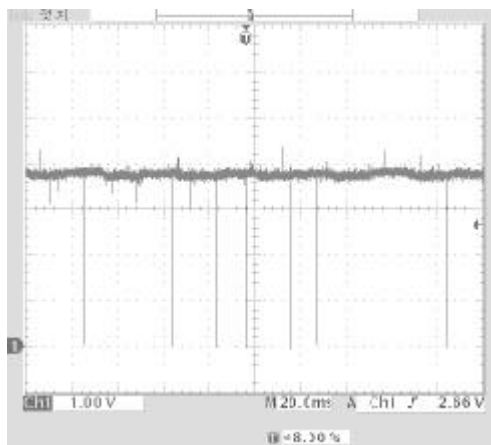
17. VFD-DATA



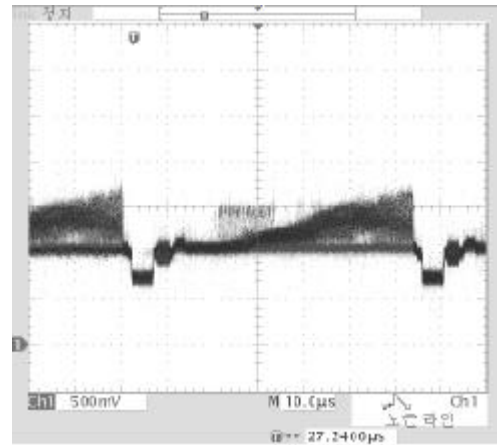
18. VFD-STB



19. VFD-CLK



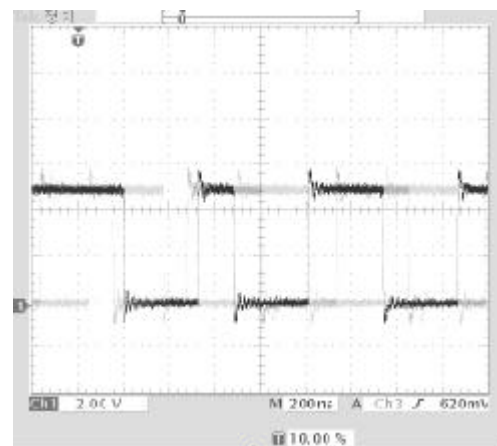
20. COMPOSITE-OUT



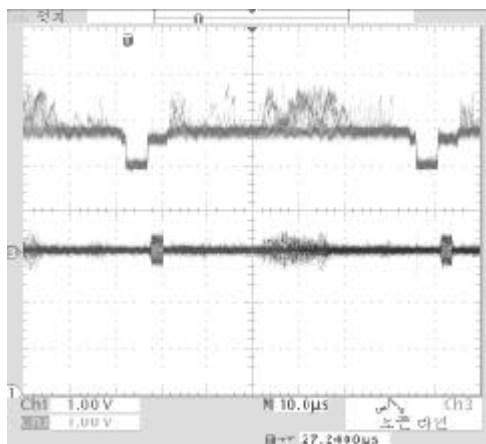
21. COXIAL-OUT



22. OPTICAL-OUT



23. S-VIDEO



24. COMPONENT OUT

